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RATIONED FERTILISERS

Best Utilisation Should Be Made In Topdressing Season

Not the least of the problems to be faced by farmers as a result of the war is how to utilise the fertiliser available during the coming topdressing season. The rationing of fertilisers was unavoidable, and attention must now be directed to ensuring that the effects of this restriction are reduced to a minimum.

By
I. L. ELLIOTT,
Supervisor of Fertiliser Supplies, Wellington.

THE first point which must be carefully considered is the type of fertiliser which should be purchased. In addition to straight superphosphate, considerable publicity has been given to the use of serpentine superphosphate, to the use of reverted superphosphate, and varying mixtures of superphosphate and lime. An article setting out the advantages to be obtained from the use of serpentine superphosphate appeared in the September issue of the "Journal," and it is only necessary to reiterate that the majority of farmers would obtain considerable benefit by purchasing serpentine superphosphate in place of superphosphate. The general conclusions to be drawn from the data presented in that article were that 3 cwt. of superphosphate was no better on the average than 3 cwt. of serpentine superphosphate. As a farmer is entitled to obtain 1 ton 8 cwt. of serpentine superphosphate for every ton of superphosphate to which he is entitled under the rationing scheme, it will readily be seen that considerable advantages are to be obtained by purchasing the former material.

If, therefore, 3 cwt. of superphosphate is no better than 3 cwt. of serpentine superphosphate, the extra 8 cwt. of serpentine superphosphate which can be purchased is as good as a further 8cwt of superphosphate.

Increased tonnages over the superphosphate allocation are also available for superphosphate-lime mixtures, and in many districts superphosphate-lime mixtures give better results than superphosphate alone. A feature of buying these mixtures, which are put up in the manufacturer's works, is that the farmer has to pay railage of lime into the works, together with a mixing charge, but this extra cost is often unnecessary, particularly in districts where copious supplies of lime are available locally. There are many difficulties in mixing the lime with superphosphate on the farm, particularly with the present labour shortage, and many farmers will prefer to pay the extra cost rather than attempt the mixing themselves, but, where possible, there is an obvious advantage in purchasing superphosphate and mixing the lime with it.

In addition to using lime in mixtures with superphosphate and other materials, the present time is ideal for the extended use of lime alone, and as much lime as possible should be used to replace the annual dressings of superphosphate normally applied. If this advice is followed, it is almost certain that better responses from phosphatic fertilisers will be obtained when they become once more freely available.

Topdressing Season

The normal season for topdressing grassland, particularly in the North Island, is in the autumn, and in order to avoid waste, farmers must consider applying whatever supplies of fertiliser are available at the optimum time. No

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hard and fast rules can be laid down, but it can be said with certainty that applications should be made sufficiently early before the cold winter weather sets in to obtain an increased growth from the plants. This will invigorate the pasture, enabling the full exploitation of added phosphate, and will thus make possible highest pasture production throughout the winter months. Normally, the winter is the period of least grass production, and it is therefore to these months that most attention must be given if it is desired to increase or maintain the carrying capacity of a pasture.

It has already been pointed out that the best time of application can be determined only by the farmer himself, as even within a radius of 30 or 40 miles considerable variations in climatic conditions may be experienced. Over a considerable portion of the North Island applications have, in the past, been made too late for best results to be obtained, and while there was some justification for this when manufacturers were experiencing difficulty in obtaining the necessary supply of trucks to make deliveries, with limited quantities of fertilisers available no undue difficulty should be experienced in obtaining supplies at the correct time. However, in order to make sure that supplies will be available when required, farmers should arrange to place their orders early and, if necessary, store before application.

Because of the cutting off of normal continental supplies of potash fertilisers through the war, a shortage in some types has arisen, mainly in supplies of the favourite 30 per cent. potash salts, but there are available in the country supplies of muriate of potash, which could possibly be used in areas such as Waihi, Taranaki, and Southland, where a known potash response is to be found. The ex store price of this material is, however, £31 5s per ton, which will be, in most cases, too dear for the average farmer to use for topdressing purposes. It must be pointed out, however, that the muriate is twice as valuable as the 30 per cent. potash salts, and that on the basis of 30 per cent. potassium oxide (K_2O) the price asked would be £15 12s 6d per ton.

Blood and Bone Restricted

Regulations were recently made restricting the distribution of blood and bone and organic fertilisers. One of the many reasons for this has been that the restricted supplies of phosphatic fertilisers have increased the demand for this commodity, leaving a short supply for market gardening requirements, which are regarded as being of first importance in the feeding of the Dominion's population. Broadly, the regulations provide for priority to be given to market gardeners' orders, but as it is expected that we shall produce about 20,000 tons of blood and bone, and as only 6000 or 7000 tons will be required for market gardening purposes, there will be a substantial surplus available for use on farms. It is as well to point out, however, that blood and bone should not be used for sowing down with a pasture mixture, as germination injury is likely, but, where available, it is most useful for topdressing. In present circumstances, it is felt that although good results will be obtained by using blood and bone for topdressing, by far the larger proportion of this material should be used on crops.

Coincidental with the increased demand for blood and bone, the demand for bone dust has also greatly increased, and there must be many places in which valuable supplies of bones are wasted. Farmers and others concerned would do well to bear in mind the value of these bones, and where quantities justify such an action, they should be saved and either used by the farmer himself on his own farm or forwarded to some purchaser for conversion into bone dust. There are many registered country slaughter houses throughout the country which, if taken in combination, should contribute a considerable amount to the available supply of bones.

Where to Apply Fertiliser

Probably the most important decision to be made by the farmer is where to apply the fertiliser with the smaller quantity available than in previous years. Here again, no hard and fast rule can be laid down, but the best results will undoubtedly be obtained if the fertiliser is applied where pastures are the best and where soil types

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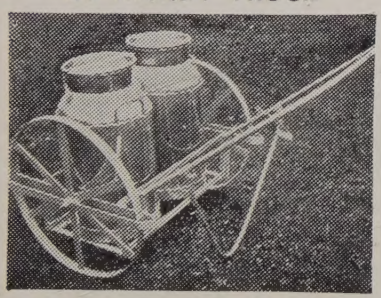

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are known to respond. A corollary to this is, therefore, that farmers should not apply fertiliser in any place where a response is, at best, doubtful. Where pastures have been sown down, it will do no harm to reiterate what has been said many times before, that to obtain the best use of phosphate or other fertilisers, the best seeds and the best possible cultivation and pre-working of the land is necessary. Where control of weeds is a factor, attention must be given to all phases of grazing management with the object of controlling by the efficient use of stock those areas which cannot be topdressed.

A method of improving the fertility of some paddocks which has all too frequently been overlooked is the feeding out of hay or silage into these paddocks, when the materials returned by the grazing animal to the pasture will, if harrowed, materially assist in maintaining and increasing its productivity. As livestock are the ultimate converters of phosphate into saleable products, more and more attention should be paid to the efficient use of the grazing animal, which will assist in conserving our already depleted supplies of fertiliser.

In recent years, particularly in overseas countries, considerable attention has been directed to placing fertiliser in such a way that best results are obtained. With the ridger and the drill, a fairly efficient type of placement is normally effected. With topdressing, it yet remains to be seen whether our present methods are the best which can be devised, but in present circumstances, with the material available, it is the best which can be put into practicable application.

Establishing Grass

Much has been said and written at various times on the best method of establishing grass, and although it is realised that the limited supplies of fertiliser available for sowing down grass after crops is probably insufficient for absolutely ideal pasture establishment, farmers should consider whether or not they are prepared to use a portion of the fertiliser allocated for topdressing purposes for the treatment of newly sown down areas. As, in most cases, the pasture has to last for many years, the best possible treatment is necessary to ensure its permanency, and it may well be worth while to omit the topdressing of some well-established pastures in order to build up and thoroughly establish any new areas. Although variations will be necessary to meet individual cases, the best results are, on the average, obtained where fertiliser is sown with the seed and where this is followed up at a later date with the topdressing of the newly sown grass.

It is fully realised that, as a result of present conditions, many new problems will be confronting farmers, but in the majority of cases some compromise between the ideal and the practicable will have to be made. Attention should be focused on seeing that this compromise is the best possible one that can be made in the circumstances.

How to make 100% use of your 40% ration of Phosphatic Fertiliser

The advice of Mr I. L. Elliott, Supervisor of Fertiliser Supplies, on how to obtain the best results from topdressing with the limited supplies of super now available, given in the July issue of The Journal of Agriculture, is sound and timely, and will be welcomed by hundreds of farmers. (1) "Use the restricted quantities on your best pastures—in general, those well supplied with clovers." (2) "Employ good grazing technique, making most efficient use of pasture growth." (3) "Ensure that the pasture is in the best condition to apply fertiliser." Finally, he

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Attempting to settle the controversy "Stripping v. Non-stripping," investigations were recently made into 28 herds on which stripping had been abandoned. No evidence was discovered to indicate that the abandonment of stripping had caused any material rise or fall in production; nor was it found that any increase in mastitis had been caused. It is suggested that the labour-saving from non-stripping should be reviewed from the possibility of releasing labour from the milking shed to increase the general efficiency of farm work.

TO STRIP, OR NOT TO STRIP!

Investigation Shows That Non-stripping Does Not Impair Production

— By —

A. H. WARD, N.Z. Dairy Board, W. G. WHITTLESTON, C. S. M. HOPKIRK, and J. F. FILMER, Animal Research Division, Department of Agriculture.

IN November and December, 1941, 28 herds were visited in connection with the problem of non-stripping of dairy cows. The purpose of the investigation was to determine whether production was seriously affected in these herds, whether any greater efficiency in milking had been achieved by the use of special milking machine units or milking machine attachments, and whether there was any significant increase or decrease in udder infections. Attention was also to be given to the number of labour units required in the shed and the length of milking time.

At 17 of the herds observations were made during the whole of the milking and notes taken on the shed routine. The milking machines were tested for efficiency of operation and samples taken from all cows for mastitis testing. At the remaining 11 herds visits were paid during the day and information obtained from the owner as to milking practices, his reasons for abandoning stripping, and his opinion on the merits or otherwise of the practice of non-stripping.

The herds visited were located as follows: Taranaki District, 2 herds; Waikato District, 8 herds; North Auckland District, 3 herds; Bay of Plenty District, 5 herds; Gisborne District, 2 herds; Hawkes Bay District, 2 herds; Manawatu District, 4 herds; Wairarapa District, 2 herds.

Shed Routine

With the exception of two or three herds where the udders were washed but no milk whatever taken from the teat, milkers followed a normal shed procedure of washing and taking a few streams of milk from each teat. Only one herd followed a practice of taking fore-milk from the cow until it was certain that the milk had been "let down," but no advantage in efficiency of milking could be detected either in production or time taken for milking as compared with other herds.

Considerable differences existed, however, in the massaging of the udder and manipulation of the teat cups towards the end of each cow's milking. This practice varied from no massage or cup manipulation at all (the cups being taken straight from the cow as soon as the sight glass indicated a cessation of milk flow) to udder massage alone and to udder massage combined with cup manipulation. The latter also varied in application. In some cases the milker merely exerted a steady downward pressure on the cups, and in others simulated the act of stripping by pressing down on the cups and then releasing pressure. The process usually occupied a period of not more than one minute, but varied considerably with individual cows. Exerting pressure on the teat cups towards the end of each cow's milking certainly appeared in most herds to result in a renewal of milk flow as judged by the sight glass, but whether this represented any significant gain in milk production was not apparent.

The whole question of habit-forming practices in the milking process needs careful study; several farmers gave instances of cows which refused to milk out to the machines, and after the abandonment of stripping were for some time stripped. Finally, the

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owners decided that stripping odd cows was not a desirable practice, and these hard milkers were left "either to milk out to the machines or get out of the herd." In the majority of cases, after a week of not being stripped, these cows were milking out cleanly to the machines, but in a few cases certain cows which the owners had decided did not milk out cleanly to the machines continued to be stripped. This practice of stripping odd cows was more prevalent in the herds which had recently abandoned stripping than in those where stripping had been abandoned for some time. This may be due to the fact that in at least four herds where stripping had not been practised for some time odd cows which were hard milkers or which dried off very early in the season has been culled from the herd. Only in one herd had more than one or two such cows been culled; this was a herd of 100 cows, where six had been culled because of hard milking.

It was quite clear from this survey that cows differed considerably in the ease with which complete milking by the machines was effected. Quite a number of owners had individual cows which had to receive special attention; in some cases in regard to "starting" and in other cases in regard to stripping—in a very few cases in regard to both.

Effect on Production

The period during which stripping had been abandoned varied considerably with the various herds. The following summary represents the general position:—

Stripping abandoned for at least 5 years, 4 herds.

Stripping abandoned for at least 3 years, 7 herds.

Stripping abandoned for at least 2 years, 3 herds.

Stripping abandoned for at least 1 year, 8 herds.

Stripping abandoned at commencement of the present milking season, 6 herds.

In 14 of the herds lactation records were available for individual cows which had been in the herd when stripping was practised and also after stripping had been abandoned. With the exception of two herds, where the numbers would have been too small, only mature cows (that is, cows four years of age or over) were used in the comparison.

A total of 300 cows were available for comparison as to the effect of stripping and non-stripping. Only normal records were used, and the records in the very poor producing season, 1938-39, were avoided wherever possible. In most cases the comparison was taken over lactations in which the seasonal conditions were reasonably comparative. The average production of these 300 cows in the season preceding the abandonment of stripping was *315 lb. of fat in 274 days.* Their production in the first season of non-stripping was *318 lb. of fat in 273 days.* It would not be valid to assume that there had been any increase in production due to the abandonment of stripping, as exceptionally good conditions in the 1940-41 season would slightly favour the production under non-stripping. This would only apply to one or two herds, however, and the general position is best indicated as follows:—

In seven herds the average production of the cows after the abandonment of stripping was within 10 lb. of

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fat of the production in the season preceding the abandonment of stripping.

In three herds there was an increase in production of more than 10 lb. of fat after abandonment of stripping.

In four herds there was a decrease of more than 10 lb. of fat after abandonment of stripping.

In all these cases of increases and decreases, however, it is probable that local herd conditions, climatic and otherwise, were mainly responsible.

The highest producing herd in which stripping has been abandoned for the past three seasons was one of 86 pedigree cows averaging between 360 and 370 lb. of fat. No significant fall in production could be detected in this herd due to the abandonment of stripping.

Furthermore, the average herd production for all these herds which had testing records prior to and subsequent to the abandonment of stripping showed no significant change in production as a result of non-stripping, the average for all herds being—

Before non-stripping—275 lb. fat, 4.9 test in 261 days.

During non-stripping—269 lb. fat, 4.9 test in 261 days.

It will be seen that neither average butterfat test nor length of lactation has been affected by the change to non-stripping.

Reasons for Abandoning Stripping

In most cases the owners had abandoned stripping because of the installation of special attachments to the milking machine designed by the makers to eliminate the necessity of stripping. In three cases, however, other and more interesting reasons were responsible.

The most outstanding case was that of a herd where the owner had not stripped a cow for the past 25 years. Non-stripping was practised from the time the first milking machine was installed 25 years ago.

In another herd—one of the highest producing herds in that particular district—stripping had been abandoned some six years ago as the result of the owner's experience with a line of 14 Grade Ayrshire heifers which he purchased at the age of four years. These cows were purchased 12 years ago, and because of their small teats, the owner decided to milk them without stripping. Six of these original Grade Ayrshire cows are still in the herd, and are now at least 16 years of age. Two of them are still producing more than 400 lb. of fat and three of the others are well above the herd average. None of these cows has been stripped for the past 12 seasons.

Another case worthy of mention because of its implications to the milking of heifers was a herd in which stripping had been abandoned as a result of the owners' experience with a line of very nervous heifers. These kicked so badly when being stripped that it was decided to let them go without stripping. The herd was under test at the time, and, as no noticeable decrease in the production of these heifers was apparent, the owners decided to abandon stripping for the rest of the herd. After five years' experience of non-stripping for the whole of the herd, the owners are quite satisfied that they have not suffered any loss in production as a result of their policy. The testing returns for individual cows prior to and subsequent to the abandonment of stripping certainly confirm this opinion.

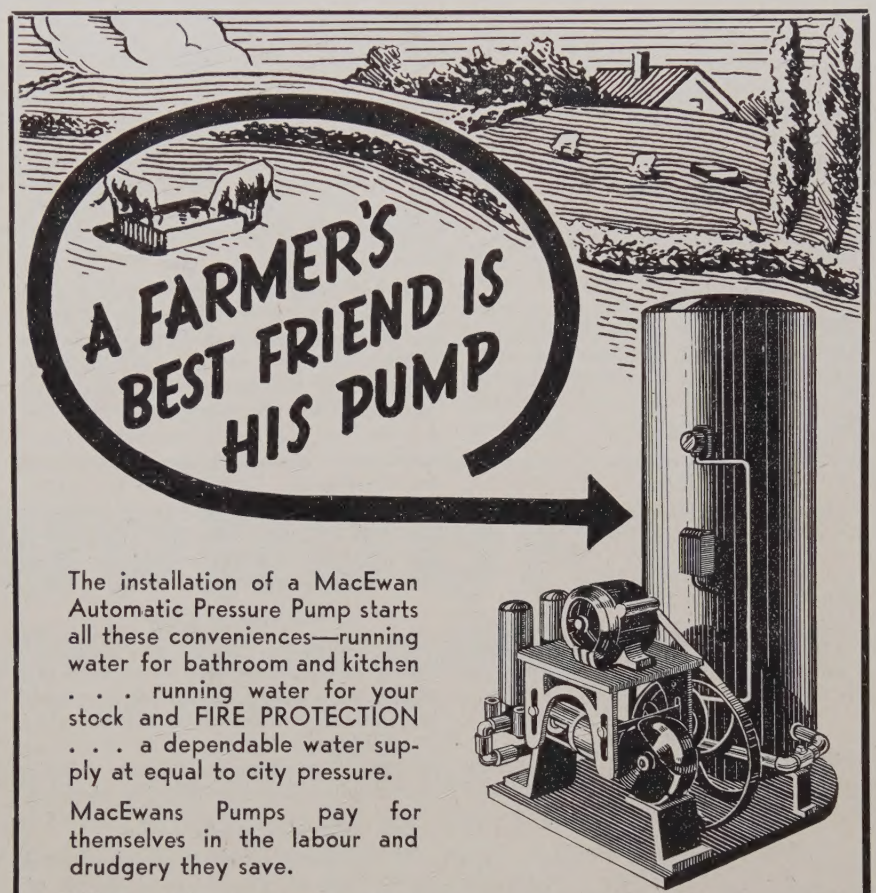

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TABLE 1.

No.	No. of Cows.	Date Stripping Stopped.	No. of Bails.	Double or Single.	Milking Rate.	Air Handling Capacity.	Vacuum at Cups. Max.	Vacuum at Cups. Min.	Pulsator Performance.	Relief Valve. Type.	Relief Valve. Condn.	Inflations. Type.	Inflations. Condn.	Type of machine.	Additional Devices.	No. of Hands.	Mastitis.
1	86	8/39	4	S	9.2	.027	16	8½	Good	P	Poor	S	Good	V.B.	—	2	6.2
2	55	8/40	3	S	9.6	.029	14	10	Good	P	N.W.	M		S	—	1	9.1
3	110	11/38	5	D	4.5	.011	13	7	Poor	P	N.W.	S	Good	S	F.R.	2	9.9
4	112	8/38	4	D	5.8	.012	—	—	Poor	P	N.W.	S	Good	S	F.R.	2	
5	30	3/41	2	D	6.4	.022	—	—	Fair	B	N.W.	S	Fair	S	W.R.*	1	
6	30	6/38	2	D	—	.021	—	—	Fair	P	Poor	S	Poor	S	F.R.	1	
7	33	5/38	3	D	3.1	.022	14	8	Fair	P	Fair	S	Good	S	F.R.	1	6.0
8	104	4/38	5	D	4.8	.014	—	—	Poor	P	Fair	S	Good	S	F.R.	3	
9	71	5/38	4	D	6.0	.015	15	13	Fair	P	N.W.	S	Fair	S	**	2	14.0
10	73	5/40	4	S	10.0	.028	13	9	Good	P	Fair	S	Good	V.B.	—	2	11.7
11	100	12/40	6	S	7.6	(.025)	14	—	Good	P	Fair	M		S	V.C.	2	8.9
12	103	12/40	6	S	7.2	.031	12	9	+	P+W	Good	M		S	V.C.	2	
13	92	1935	6	D	6.1	.016	17½	8½	Good	P	Good	S	Poor	V.B.	—	2	11.2
14	76	5/40	4	D	4.3	.022	16	9½	Fair	P	Good	S	Good	S	F.R.	2	5.6
15	52	10/40	2	S	11.5	.041	—	—	Good	B	Fair	S	Good	V.B.	—	1	
16	94	8/41	6	S	9.4	.018	15½	12	Poor	B	Fair	S	Fair	S (D)	—	2	11.4
17	84	8/41	5	S	6.7	.028	13	—	Good	P	Good	M		S	V.C.	1	
18	112	7/41	6	S	7.1	.018	11½	7	Good	P	Fair	S	Poor	V.B.	—	2	7.1
19	49	7/41	3	S	8.0	.047	14½	9½	Good	P	Good	S	Good	V.B.	—	2	7.1
20	33	7/41	3	S	8.8	.028	16	11	Good	P	Fair	S	Good	V.B.	—	1	5.2
21	51	10/39	3	D	5.3	.019	15	9	Fair	P	N.W.	S	Poor	S	F.R.	2	10.3
22	54	6/38	4	D	4.5	.017	—	—	Fair	P	Fair	S	Fair	S	F.R.	1	
23	50	10/40	3	S	7.4	(.027)	17	—	Fair	B	Fair	S	Good	S (D)	—	1	
24	53	11/38	4	S	9.5	.029	14	9	Good	P	Good	M		S	—	1	12.7
25	30	8/39	3	S	8.6	(.020)	—	—	Fair	B	Fair	S	Fair	S (D)	—	1	
26	56	5/36	4	S	9.3	.032	15	11½	Good	P	Fair	S	Good	S	—	2	2.7
27	78	11/40	4	S	8.1	.036	—	—	Good	P	Fair	S	Poor	V.B.	***	2	
28	62	1916	4	S	8.9	.028	16½	10½	Good	P	Poor	S	Good	S	—	1½‡	6.4

‡ 2 shed hands at morning milking. 1 shed hand at evening milking.

Table Explained

Some of the other observations made during the investigation are summarised in Table 1, in connection with which the following notes should be read in interpretation of the terms and figures used:—

Bails

The numbers shown are the numbers of two-cow bails.

Double or Single

Single refers to the usual layout in which cups are placed on only one cow in each double bail. *Double* refers to an arrangement by which all cows can be milked simultaneously.

Milking Rate

This is an approximate figure representing the number of cows milked per hour per set of cups.

Air Handling Capacity

This is an approximate figure representing the cubic feet which the vacuum pump can displace per second when operating at a vacuum of 15 in. above the requirement of the pulsators divided by the number of sets of cups. (Except in the case of the bracketed figures, which represent the total air handled by the pump per set of cups, and which must be reduced somewhat in comparing them with the other figures). These figures would be affected by any leakages in the machine as well as by the power and rate of the pumps.

Vacuum at Cups

These figures (inches of mercury) represent the maximum and minimum points on a graph drawn by a recording vacuum gauge while the machine is milking and when milk flow has ceased. The maximum figure usually occurs when the milk flow has stopped.

Pulsator Performance

This column gives a very general description of the pulsator graph of the machine in question drawn by a recording vacuum gauge. The description refers mainly to the shape of the squeeze and release phases of the graphs—"snappy" squeeze and release phases are regarded as "good."

Relief Valves

Type: P = Poppet type; B = Ball type; W = Weighted. Condition: This is a general description. N.W. = Not working.

Inflations

Type: S = Soft; M = Moulded. Condition: This is a general description based on the routine associated with the care of the inflations. If the latter are used for periods up to four to five weeks and are tightened regularly they are described as "good." Inflations not tightened regularly and used for periods greater than eight weeks are described as "poor." The rest are "fair." Moulded inflations are not commented on, as in all but one case they were only renewed at the beginning of each season.

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Type of Machine

This is a very general classification. V.B. = "Vacuum Break" machine of any make employing the principle of causing by some mechanical means a regular drop in the vacuum at the teat cups. S. = Simple orthodox releaser plant with no features affecting the vacuum at the cups built into it. S (D) = Simple plant with diaphragm pump in place of releaser.

Additional Devices

This column refers to devices added to the machine which materially affect the vacuum at the cups. F.R. = Float controlled reducing valves of all kinds. W.R. = Simple weighted reducing valves of all makes. V.C. = Valves designed to reduce the vacuum when milk is not flowing but to give full milk pipe vacuum (less reduction due to milk flow) at the cups when milk is flowing. * = The valves on this machine were not seating properly and so will have no effect when no milk is flowing. ** = This machine uses a very large amount of air admission and small moveable raising bowls. *** = This machine has a raising can with a lift of about 4 ft. to the releaser. + = The pulsator droppers on this machine are fitted with valves which (as they were fitted when examined) give a slow release but normal squeeze to the inflations.

Mastitis

Mastitis is a disease in which visible symptoms often appear only intermittently. No field test is available which will detect all cases in which symptoms are not active at the time of inspection. The figures given in the table were reached by adding together dry quarters, quarters giving obviously abnormal milk, and other quarters giving reactions to the Brom thymol blue test and expressing the total as a percentage of total quarters.

Discussion: Some of the findings tabulated are of sufficient interest to warrant further discussion.

Rate of Milking

The average rate of milking for all of the machines examined is 7.25 cows/hour/set of cups. For doubled plants it is 5.0, and for single plants 8.6. If we take the number of cows per *bail*, that is, per two sets of cups in a doubled plant, we get an average of 10.0, which is only 1.16 times as fast as the average single-bail plant. This point is brought out equally clearly if we take two specific sizes of machine. In the case of the three-cow plants, doubled machines with float-controlled reducing valves have an average milking rate of 4.2. Single unit plants of the same size have a rate of 8.5, which means that the speed per bail is actually slightly lower in the case of the doubled plants. For four-cow plants the average speeds are: Double = 5.2; single = 9.2. The increase in speed *per bail* is only 1.13. This means that it would be much more efficient if a decrease in milking time is sought to add another single bail to a four or five-cow plant.

In all but one of the doubled plants some kind of vacuum-reducing unit is used. The one exception had a milking rate of 6.0 cows/hour/set of cups, which is considerably below the average for the single plants. The average for "vacuum break" (single units) is 9.0, which is the same as that for single machines without additional devices.

It is interesting to note that where soft inflations are used and kept in good condition, the average milking rate is 9.1 cows/hour/set of cups for single machines. In the group whose inflations may be described as "fair" to "poor" the average milking rate is 8.3.

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The following table summarises the milking rates of certain types of machines:—

TABLE 2.

Type.	No.	Milking Rate.
Vacuum Breaks (total ..	8	8.6
Vacuum Breaks (single)	7	9.0
Vacuum Breaks (double)	1	6.1
Float-controlled Reducing Valves (double) ..	7	4.6
Simple Machines with Soft Inflations (single) ..	5	8.3
Simple Machine with Moulded Inflations ..	2	9.6

Air-handling Capacity

The average relative air-handling capacity of the pumps on the machines examined is approximately .024 cubic feet of air/second/set of cups. The figure for single machines is .029, while that for double machines is .017. An inspection of Table 1 will show that pump capacity and rate of milking seem to be related. With a few exceptions, high rates of milking are associated with pump capacities above average.

It is evident that a good pump capacity will assist milking in many ways. Firstly, the cup will stay on better than when the pump is inadequate. Secondly, the vacuum at the cups will be more nearly constant; the drop due to milk flow will be at a minimum. Thirdly, the tendency for milk to shake up the pipes will be reduced considerably when the pump maintains a brisk air flow. Fourthly, from inspection of the graphs drawn by a recording vacuum gauge attached to the claw pulsator nipples of the machines concerned, it appears that adequate air flow is associated with a "snappy" release phase of the pulsator cycle. It is possible that relative pump capacity is a factor causing reduction in milking rate when a plant is doubled. As can be seen from the average figures for double and single plants, it is evident that the double plants do not have increased pump capacity provided.

In practice, the following points must be included in consideration of pump capacity:—

(1) Leaks in the Machine.—Any leakage of air into the system reduces the effective capacity of the pump. Rubber connections and bungs should be inspected regularly and renewed when showing signs of perishing. Pulsator valves should be reground when showing signs of wear. Releaser flaps should seat correctly. Rubber rings in releaser and vacuum tank should be renewed regularly.

(2) Relief Valves.—Poor sensitivity in the relief valve will give the same effect as leaks; air will continue to be admitted into the machine when the vacuum has fallen below the desired level, causing a reduction in the effective capacity of the pump. Weighted valves or spring-loaded poppet valves with covered springs are recommended. The latter should be lightly lubricated from time to time.

(3) "Slippage" in the Pump.—In any vacuum pump there are slight leakages which permit air to travel back from the exhaust to the intake.

In the case of piston pumps, leaky valves and pistons are the main sources of trouble. In a rotary pump leakage can take place between the blades and the inner surface of the body, between the ends of the rotor and body, and around the blades via the slots in the rotor. Because of the areas involved, unless clearances are very small, considerable leakage can occur in a rotary pump as result of wear. The essential point in maintenance with both kinds of pump is adequate and regular lubrication with the right grade of oil. It would appear from present evidence that a capacity of .03 cubic feet/second/set of cups (under the conditions set out) above the requirements of the pulsators is about correct. A pump displacing four times this quantity of air will pull a vacuum of approximately 10 in. with a leak of $\frac{1}{4}$ in. in

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the system, which means that the pump on a four-cow single plant should reach this standard. Some indication of the speed required for a standard pump may be gathered from the fact that a standard rotary pump (7½ in. diameter x 6 in. wide) will provide a three-cow single plant fitted with individual pulsators and separate releaser pulsator all working at 40 pulsations per minute with .036 cubic feet of air/second/set of cups (under the conditions given above) when running at 235 r.p.m.

Vacuum at Cups

Data collected supports other available evidence that the speed of milking is not correlated with the level of vacuum. There is therefore no advantage to be gained from using a vacuum greater than that necessary to keep the cups on well, and in a well-constructed and properly maintained machine this should never exceed 14 inches.

Pulsators

Cleanliness of milking is connected with the efficiency of the pulsator. The latter tend to be less efficient on "doubled-up" plants because of the greater number of cups to be served. This is a further factor which tends to reduce the efficiency of "doubled-up" machines. The best pulsator action is obtained by using a wide rectangular ported pulsator with one port per set of cups. The closer the pulsator is to the claw the more effective the action. This fact accounts for the excellent performance of the pulsators incorporated in certain "vacuum break" units. Pulsator speeds of 40 pulsations/minute and ratios of 40:60 (squeeze:release) for soft inflations seem satisfactory.

Air Admission

In general, this was satisfactory. Air admission holes must be kept clear for fast clean milking. Single 1/32 in. holes in the claws seem to be adequate, and must be cleaned with a pricker regularly.

Labour in Milking Shed

The number of shed hands actually engaged in the milking process in the herds surveyed can be summarised as follows:—

In the six herds consisting of 100 cows or more, five were milked by two shed hands and one by three.

In the six herds consisting of 76 to 100 cows, five were milked by two shed hands and the other by the owner alone.

In the ten herds consisting of between 50 and 75 cows, four were milked by two shed hands and five by the owner or manager alone.

The remaining herd of 62 cows was milked by the owner alone at night and the owner and son in the morning.

In the six herds consisting of less than fifty cows, one was milked by two shed hands and the remaining five by the owner alone.

From the above data it appears that considerable saving can be made in the number of labour units required for the *actual milking process.* This should not, in any circumstances, be confused with the number of labour units required for the complete farming operations, and the whole problem should be viewed from the possibility of releasing labour from the actual milking operations in order to increase the general efficiency of farm operations as a whole. In circumstances of emergency, farm maintenance work may have to be neglected for short periods, but the results of this neglect will soon have their effect on the herd production. Any labour released from the milking shed should therefore be employed in completing all maintenance and improvement work against such a possible emergency.

It is a point worthy of mention that in two or three sheds, as a result of non-stripping, leg roping of the cows was considered quite unnecessary. This would also assist in reducing the labour involved in the milking operations, as well as being a desirable practice in keeping the milkers' hands as clean as possible.

Mastitis

During the months December, 1938, to March, 1939, the New Zealand Dairy Board carried out Brom thymol blue tests on from 70,000 to 95,000 cows. The sum of dry quarters and quarters giving positive reactions varied from 8.3 to 8.8 per cent. Although too much reliance must not be placed on figures based on the Brom thymol blue test, it is interesting to note the very close agreement between these figures and the average of 8.6 per cent. obtained in the present investigation.

A number of the dairy farmers visited were of the opinion that they had experienced less trouble from mastitis since abandoning stripping. Unfortunately, there are no records of mastitis incidence in the herds concerned which could be

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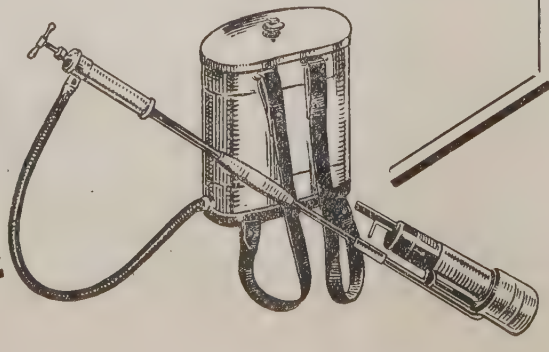

used to support these opinions. However, no unusually high incidence of mastitis was encountered in any herd, and the figures quoted above indicate that cessation of stripping had not led to any increase of mastitis. There was no marked difference between the incidence of mastitis in herds which had recently abandoned stripping and those which had not stripped for a number of years.

In view of the claims made for some milking machines, it is interesting to compare the incidence of mastitis in herds using the various types of machines. In four herds using simple machines, mastitis varied from 2.7 to 12.7, with an average of 7.7 per cent., while the corresponding figures in six herds using vacuum break machines were 5.2 and 11.7, with an average of 8.1 per cent., and in six herds using machines with vacuum reducing and other accessories, 5.6 and 14.0, with an average of 9.1 per cent. No correlation was observed between mastitis incidence and the speed of milking, maximum vacuum at cups, or performance of pulsators and relief valves. The observations made do, however, suggest that the condition of inflations may have some effect, and they are therefore summarised in Table 3. It will be noticed that all of the six herds with mastitis incidence below 7 per cent. had inflations in good condition.

TABLE 3.

Inflations.	Mastitis. Individual Herds.	Average.
Moulded	8.9, 9.1, 12.7 ..	10.2%
Soft—Poor condition	7.1, 10.3, 11.2 ..	9.5%
Soft—Fair condition	11.4, 14.0, ..	12.7%
Soft—Good condition	2.7, 5.2, 5.6, 6.0, 6.2, 6.4, 7.1, 9.9, 11.7	6.8%

Summary and Conclusions

(1) A survey has been made of 28 herds in which the cows have not been stripped for periods ranging from one to 25 years.

(2) No evidence was discovered to indicate that the abandonment of stripping had caused any material rise or fall in production in any herd.

(3) The percentage of mastitis varied considerably, but was not unusually high in any of the herds examined. A number of owners expressed the opinion that they had experienced less trouble from mastitis since abandoning stripping, although there is not sufficient evidence available to confirm this contention. On the other hand, it seems safe to assume that the abandonment of stripping has not caused any increase of mastitis in any of the herds visited.

(4) Machines of widely varying types were encountered, but the evidence suggests that the practice of non-stripping can be adopted with any simple, soundly-constructed machine which is kept in thoroughly efficient working order without the addition of any special accessories.

(5) Proper care of the milking machine is always necessary, and obviously when the milking machine is asked to strip the cows it becomes even more important. Special attention should be paid to inflations, relief valves, vacuum gauges, leaks, air admission and pumps.

(6) When stripping is first abandoned special care must be taken to see that individual cows do not retain abnormal amounts of milk, and at no time should the ordinary care necessary in machine milking be relaxed.

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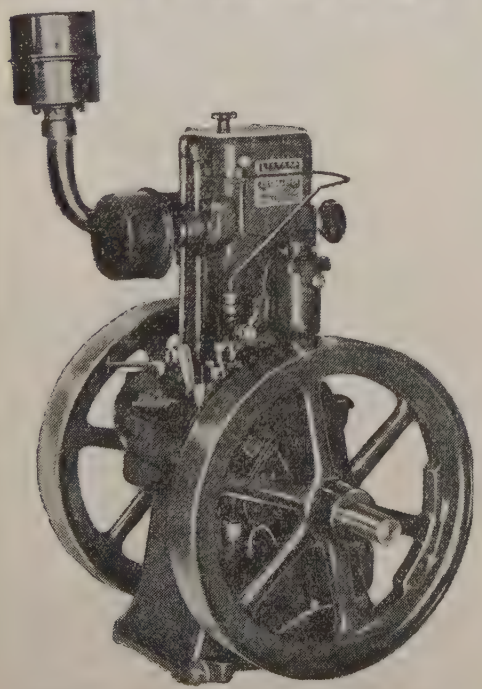

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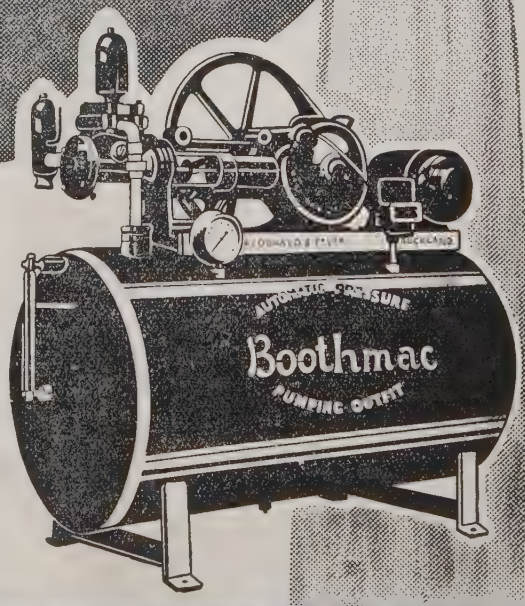

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Liquid Manure

Installations of Sumps, By-passes And Distributors

By
G. A. BLAKE,
Instructor in Agriculture,
Stratford.

IN the July issue of the "Journal" attention was drawn to the value of the animal manure dropped in the cowshed, and means of distributing this over the pastures in the liquid form were also described. Since then, results have shown that when the whole of the shed washings—that is, the droppings, urine and water—are stored in a sump for about ten days, quicker and better results are obtained.

Sumps

The most common type is the square or oblong sump, preferably not over six feet deep to allow easy stirring.

Fig. 1.—The square or oblong sump, not over six feet deep, is the most popular type.

Fig. 2.—Twin sumps allow of the use of matured material only.

By using three bags of cement to a yard of shingle and making the walls and bottom 3 inches to 4 inches thick, it will be found that approximately six yards of shingle and one ton of cement will make a sump of 4000 gallons capacity, which is a popular size. Reinforcing of the walls is necessary, and cyclone or similar pig netting is very suitable. A slight fall in the bottom of the sump towards the outlet, where it is emptied by gravity, makes for easy cleaning.

Fig. 3.—A sump at the edge of the yard contravenes the Dairy Regulations.

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clayey nature, the walls may be plastered, but the bottom should be three inches thick. With this plaster type of wall, a round sump is better, thus avoiding all corners. Wire netting of a heavy gauge is pegged to the walls with staples made from No. 8 fencing wire, and the whole is covered with the concrete mixture thickly enough to cover the netting completely —about 1½ inches to 2 inches. A thin coat of plaster made from equal parts of sand and cement is applied later. The cost of this type of wall, however, is practically the same as the solid concrete structure. Sumps made by plastering direct on to the clay without any netting have not proved satisfactory, and have filled with water from the surrounding soil.

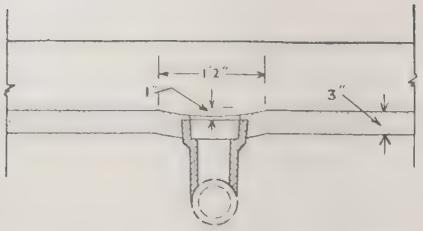

Fig. 4.—Sketch of a by-pass constructed by placing a 4-inch pipe bend in a depression in the drain to the sump.

Because the stored material gives better results, many farmers are now building twin sumps, emptying one when the other is almost full. Although this system is recommended, the cost of the installation is increased, and considerable time must elapse before the better results obtained offset this added cost.

It should be noted that the Dairy Regulations require the sump to be 30 feet from the shed or yards, so that a sump constructed at the edge of the yard, even though 30 feet from the shed, contravenes the regulations.

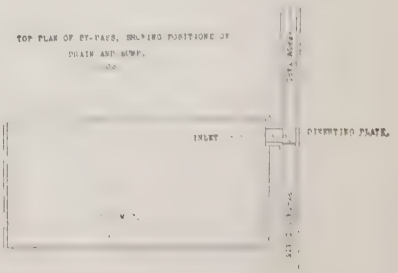

Fig. 5.—Sketch of by-pass constructed by placing the sump alongside the drain and using diverting plates.

Where gravity emptying is employed, the available fall determines the depth of the sump, but the following dimensions give an indication of the sizes most preferred:—

10ft. x 10ft. x 5ft. deep holds 3125 gallons.

10ft. x 10ft. x 6ft. deep holds 3750 gallons.

12ft. x 12ft. x 5ft. deep holds 4500 gallons.

A round sump with a diameter of 12 feet and a depth of 6 feet will hold 4243 gallons.

By-passes

When the lay-out is so constructed that all the washings eventually find their way into the sump or distributor, it soon becomes evident that some provision must be made to divert rain or other unwanted water, such as that used for washing the milking plant and

Fig. 6.—Where sufficient fall is available, pipe drains can be used to convey the manure to the sump and unwanted water to a drain or creek.

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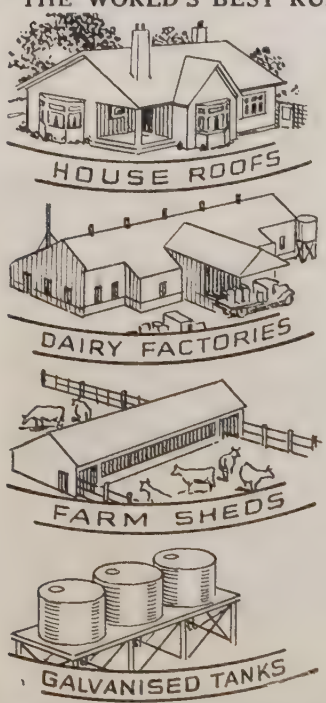

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Fig. 7.—The most common distributor is the square iron tank mounted on a konaki.

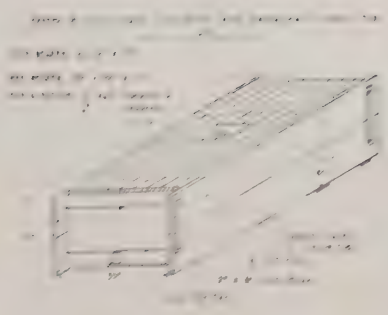

Fig. 8.—Sketch of wooden distributor with dimensions.

Fig 9.—A distributor mounted on a motor-lorry.

cans. When it is realised that under an 80 inches rainfall a stockyard 33 feet square will catch 200 tons of water a year, the need of some means of diverting this water is again evident.

Because no two installations are identical in construction, different types of by-passes have been evolved. The best type so far encountered is constructed by making a slight depression in the base of the drain and placing in this depression a 4 inch glazed pipe open with the flange end flush with the bottom of it and the other end leading into a stormwater drain. Between milkings this pipe is left open, but when the drain is needed to carry the manure to the sump, a plug is placed in the flange end of the pipe and the manure swept over it. (See Fig. 4.)

Another type is constructed by putting the sump alongside the drain instead of at the end of it. A portion of the wall of the drain is movable, and when the sump is needed this portion is removed and placed across the drain to divert the manure into the sump. When stormwater has to be diverted it simply flows along the drain past the sump, and into a creek,

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Fig 10.—A distributor mounted on a horse-drawn wagon.

or soaks away. In some installations two drains have been constructed from the yard, one for the manure to the sump, and the other for stormwater leading away from the yard. Movable trap-doors are used at the entrances of these drains so that either drain can be closed or left open as desired.

Where the sump is considerably below the level of the stockyard the manure can be conveyed to it by means of 6-inch pipes. In these instances, another pipe drain of 4-inch pipes can be used to divert the unwanted water, and by the use of suitable plugs either drain can be used as desired.

Distributors

The most common type of distributor is the square iron tank, either 200 or 400 gallons capacity, mounted on a konaki. The platform is constructed about 3 feet longer than the tank so that there is ample room in front to allow comfortable standing room for the driver. This is especially necessary when driving through gateways or over bridges. The konaki is fitted with the usual iron skid in front, while the wheels can vary in size from 18 inches to 24 inches in diameter, but must be fitted with a 6-inch tread to lessen damage to gateways and pastures. A 2-inch axle is sufficient to support the load. The tank, which is fixed on the back of the konaki, is fitted with a splash-proof lid and a 2½-inch or 3-inch tap that can be opened or closed quickly. If procurable, a cheese vat tap is ideal, but failing this, any straight-through tap is suitable.

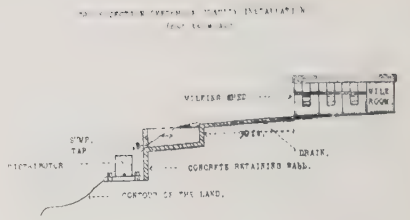


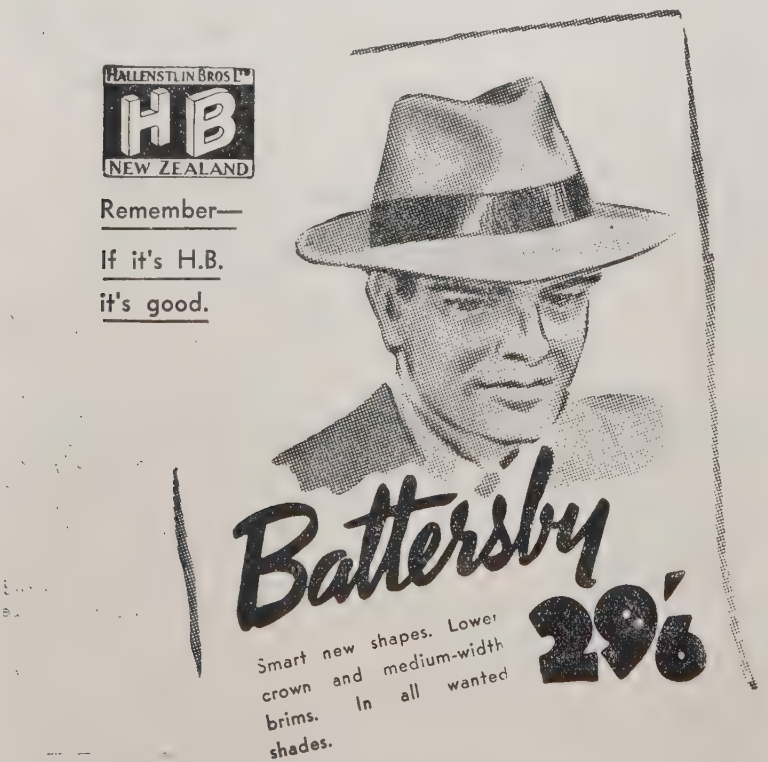
Fig 11.—Cross-section sketch of a gravity installation.

It will be found that square iron tanks are in short supply, and if they are unprocurable, a distributor can be built with timber. This procedure is necessary in some cases where the fall is too small to allow the use of a tank. These wooden distributors are made from 1½-inch timber, and a popular size is 6 feet long by 3 feet wide by 2 feet deep, having a capacity of approximately one ton of manure. In addition to the tap and splash-proof lid, it is advisable to fit two tie-bolts of ½-inch iron across each end of the box, so that if shrinkage occurs the bolts can be tightened and the joints again made waterproof. For this purpose the sides of the box should project about 3 inches beyond the ends, and all other parts of the box, including the top and the bottom, should be built between the sides.

If the country is undulating and much surging of the material is likely in the box, baffle plates should be fitted to the inside to reduce wear and tear on the distributor from this cause. These plates are made from 1-inch or 1½-inch timber, and are placed 2 feet from each end of the box, and right across it, but 1 inch below the top to leave an air vent, and about 8 inches from the floor to allow sufficient room for periodical removal of the sand that settles in the distributor.

A distributor can be mounted on a sledge, a konaki, a wagon, or a motor-lorry, so that in most cases the type of conveyance already in use on the farm is suitable. The sledge and the horse-drawn wagon both have a common fault in that the tyres or runners are too narrow for use in wet weather, both tending to cause damage to gateways and pastures.

All photographs are by the author.



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Continuing his article on poisonings of livestock from the January issue, the author goes on to deal with a number of other common plants which may cause stock mortality. It is probable that these two lists include most plants likely to cause losses of importance in this country.

POISONINGS OF LIVESTOCK

By
D. MARSHALL,
District Superintendent,
Livestock Division, Wellington.

RAGWORT has probably been the cause of greater stock loss in New Zealand than all other forms of poisoning put together. The work of Gilruth about 40 years ago first established its poisonous nature. The toxic principle is in greatest amount in the flowering stage, and remains active even though the plant may be cut and dried, as in hay. There is evidently much less in the low rosette stage, as attempts to produce poisoning with this stage in sheep have failed.

Cattle, sheep, and horses are liable to poisoning. In cattle, there is believed to be a type of acute poisoning where animals are compelled to eat large amounts of the weed over a short period, deaths occurring within six or eight weeks. Typical ragwort poisoning is a chronic, slowly-developing condition. The final symptoms and death appear to be due not so much to the poison as to the state of the liver which it has produced. The chronic irritation of the toxin causes such an increase in fibrous tissue that the specialised liver tissue is largely destroyed and its function lost. A feature is the occasional appearance of symptoms two to six months after the animals have been removed from ragwort areas. It is pleasing to note that, with the reduction in rank ragwort growth due to systematic clearing campaigns or to the greater use of sheep for control, there has been a marked reduction in cattle losses from this cause.

Symptoms

Symptoms in cattle are indefinite unthriftiness and loss of condition, and later, diarrhoea, nervous disturbance, and irritability, and frequent heaving and straining. These symptoms may be observed over periods of three to six weeks. On post-mortem examination the carcass is found emaciated, the fat is watery and jelly-like, and dropsical fluid is found in the belly cavity, even distending the folds in the lining of the fourth stomach. The liver is characteristic, being slatey bluish in colour, and tough and rubbery to handle or cut due to excess fibrous tissue.

In horses, the observed duration is shorter. There is dullness, unsteadiness, and paddling of hind limbs, and a tendency to wander aimlessly or blunder into fences, etc. Sheep appear to be more resistant. Old ewes acquire a taste for the weed, and in a fresh paddock may be seen eating the flowering ragwort before anything else. Mortality may occur in animals exposed to ragwort feeding over periods of 12 months or more where much of it is in a rank or flowering state, but there is considerable evidence that, once the rough has been cleared up, they can graze the rosette stage with little risk.

Deaths in cattle appear to be most common in the late spring, when the flush of feed appears, probably because of the greater strain on the already damaged liver.

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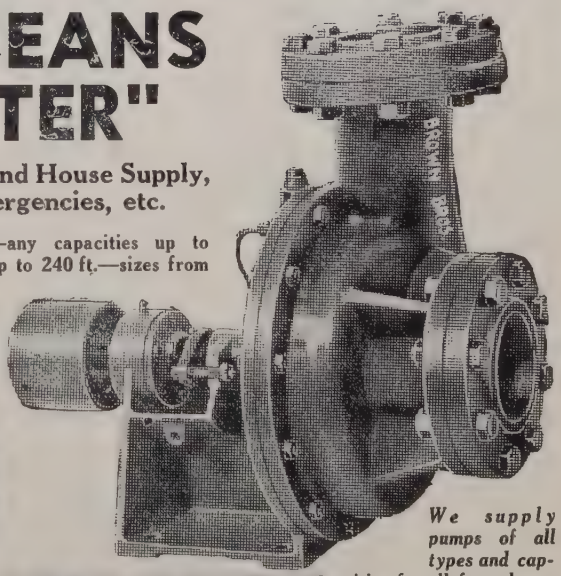

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No form of treatment appears to have much influence on ragwort poisoning once symptoms appear, and when one considers the state of the liver, this is not surprising.

Tutu

Tutu causes a spectacular type of poisoning, and at one time it was not uncommon for comparatively large numbers of cattle on "trek" to be lost either through being put hungry into paddocks containing the plant or through eating it on the roadside. Poisoning usually occurs where animals are put into strange pastures.

The alkaloid of tutu is, in effect, something like strychnine, and the symptoms observed are usually excitement and increased response to any stimulus, bellowing, a tendency to fits or spasms, and bloating. Bleeding was the stockman's remedy, and heroic feats were performed in ensuring this from the roof of the mouth, the ears, or the tail. Kerosene was also given internally. Sedatives in full doses, such as chloral hydrate, together with tapping, if required, to relieve bloat, may be useful in otherwise quiet animals. With run cattle, such treatment may be impracticable, and beyond removing them from the tutu-infested area, they are probably better left quietly alone.

Hemlock

The spotted hemlock has a leaf slightly resembling a carrot, a stem speckled with brown, and heads of small white flowers. It may reach a height of five feet, and has an unpleasant smell, so that stock are unlikely to eat it unless compelled to, as in bare runs and paddocks. In one observed instance the symptoms resembled those of milk fever, the cows showing dullness, sleepy expression, semi-paralysis, and lowered temperature. Treatment is by free use of stimulants. Poisoning in pigs has been noted where the plant was plentiful in runs.

Ngaio

The ngaio is a common tree in coastal regions, and frequent instances of poisoning in cattle are on record, particularly following storms where branches or whole trees have been blown down. Symptoms noted have been staggering, constipation, and evidence of severe pain.

Buttercup

Definite confirmation of poisoning by buttercups, by experiment or in the field, appears difficult to obtain, although certain species have long been considered dangerous. Aston reviews the subject in the "Journal" (June, 1918). Two common species, *R. repens*, the creeping buttercup, and *R. Sardous*, are believed to be only slightly, if at all, poisonous, which is fortunate, as particularly the latter—a low-growing, somewhat hairy plant—is extremely common in many damp areas, notably in parts of the Hauraki Plains, so that stock can hardly avoid

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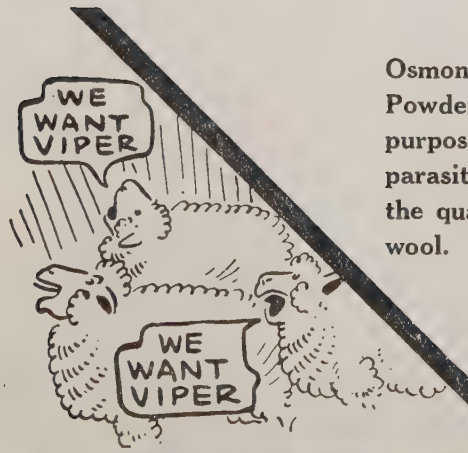

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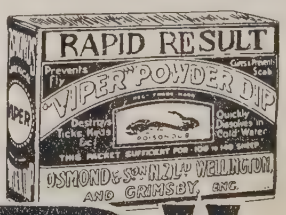

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eating it. *R. Acris*, the tall crowsfoot, an erect plant about two or three feet high, with much divided leaves, has been frequently blamed for deaths of cattle in other lands, but does not appear common in New Zealand. Plants have been observed in the Woodville district. *R. Scleratus*, the celery-leaved buttercup, is a succulent, shiny-leaved plant which is found commonly in ditches or wet areas growing at water-level. It has been associated with deaths in cows, although the feeding of sheep with the plant from the same area produced no harmful effects. *R. rivularis* (Waoriki) has also a bad reputation.

The reputedly poisonous varieties are stated to be most dangerous at the flowering stage. They contain an acrid juice, which has a blistering, irritant effect on the lining of the mouth and alimentary tract, and the symptoms are colicky pains, salivation, depression, slow, weak pulse, and slow, snoring breathing.

Nightshade

The black nightshade is a common annual weed up to two feet high, bearing little white flowers, followed by green berries, which later turn black. It is a weed of cultivated land. Poisoning by black nightshade is described by Bonner in the "Journal" (August, 1938). The symptoms were staggering, delirium, and later, coma, with occasional convulsions. The poison is in largest amount in the berries. The extent to which the plant is poisonous may vary in different seasons, and probably a considerable amount is required to cause symptoms.

Privet

Poisoning of yearling heifers by privet was described in the "Journal" for November, 1939. Intense inflammation of the lining of the fourth stomach and part of intestine was found in two affected animals on post-mortem examination. The berries are believed to be the most poisonous part of the plant, and poisoning would be most likely to occur from untrimmed

Slaughterings of Stock

THE following returns of slaughterings of stock at meat-export slaughterhouses and abattoirs for the eight months, May-December, 1941, have been compiled by the Livestock Division:—

District	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Swine
North Island.						
Meat-export Slaughterhouses—						
Auckland	98,836	567,921	65,521	25,503	573,796	201,972
Poverty Bay-Hawke's Bay	34,612	52,849	125,060	30,507	903,170	16,668
Taranaki-Manawatu	45,603	214,256	31,196	7,588	550,264	83,699
Wairarapa-Wellington	26,213	25,353	59,290	10,986	395,188	17,312
Totals	205,264	860,379	281,067	74,584	2,422,418	319,651
Abattoirs	80,286	26,427	346,580	172,951	61,782	81,441
North Island Totals	285,550	886,806	627,647	247,535	2,484,200	401,092
South Island.						
Meat-export Slaughterhouses—						
Nelson-Marlborough	699	11,090	12,953	6,911	99,685	6,368
Canterbury	7,122	37,670	191,972	148,881	880,951	21,394
Otago-Southland	4,115	42,124	142,253	130,621	701,734	4,471
Totals	11,936	90,884	347,178	286,413	1,682,370	32,233
Abattoirs	36,231	8,862	179,582	96,226	32,062	29,410
South Island Totals	48,167	99,746	526,760	382,639	1,714,432	61,643
Dominion.						
Meat-expt. Slaughterhouses	217,200	951,263	628,245	360,997	4,104,788	351,884
Abattoirs	116,517	35,289	526,162	269,177	93,844	110,851
Grand Totals	333,717	986,552	1,154,407	630,174	4,198,632	462,735
Same Periods, 1940— Meat Export Slaughterhouses and Abattoirs	372,837	1,011,262	1,257,520	755,084	3,226,707	421,384
Same Periods, 1939— Meat Export Slaughterhouses and Abattoirs	316,346	1,000,986	1,096,832	547,475	3,263,313	328,024

Slaughterings of Pigs

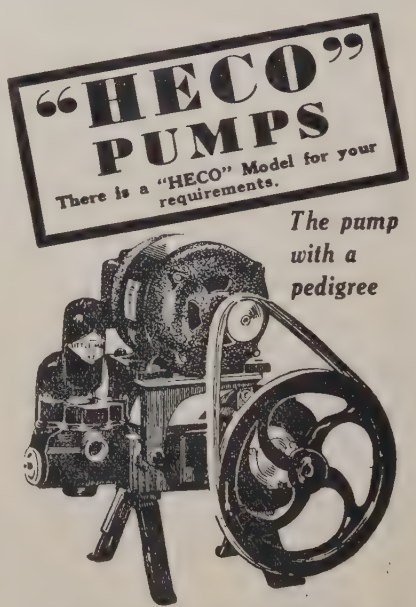
The 101,268 pigs slaughtered in meat-export slaughterhouses and abattoirs during December were distributed in weight ranges approximately as follows:—

Up to 60 lb.	430
61-110 lb.	25,699
111-120 lb.	10,068
121-160 lb.	52,162
161-180 lb.	7,314
Over 180 lb.	2,407
Sundries	3,188
	101,268

The grading of porkers is 92 per cent. of first quality and 8 per cent. of second quality, and the grading of baconers is 78 per cent. of prime 1's, 17 per cent. of prime 2's, and 5 per cent. of second quality.

In the different weight ranges of baconers the grading is as follows:—

111-120 lb.	86%, 10%, 4% of P1, P2 and 2nds respectively.
121-160 lb.	78%, 17%, 5% of P1, P2 and 2nds respectively.
161-180 lb.	60%, 29%, 11% of P1, P2 and 2nds respectively.



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privet hedges. Horses have also been poisoned.

Mangolds

Deaths following the feeding of mangolds have been recorded from time to time. In each case, the roots had apparently not been stored long enough. Aston in the "Journal" for September and October, 1911, discusses the matter, and suggests that poisoning may result from nitrites formed from the nitrates in the root, which, in certain conditions, are present in abnormal amount. In one observed case eight cows were found dead on the morning following the feeding out of a load of mangolds. In two other cases pigs died rather suddenly after mangold feeding. Analysis of mangolds in two of these cases showed an above normal amount of nitrites. Mangolds are a useful feed, and any risk is largely avoided by lifting and storing for two months before use.

This list, together with the notes published in the January issue of the "Journal," probably includes most plants likely to cause losses of importance in this country.

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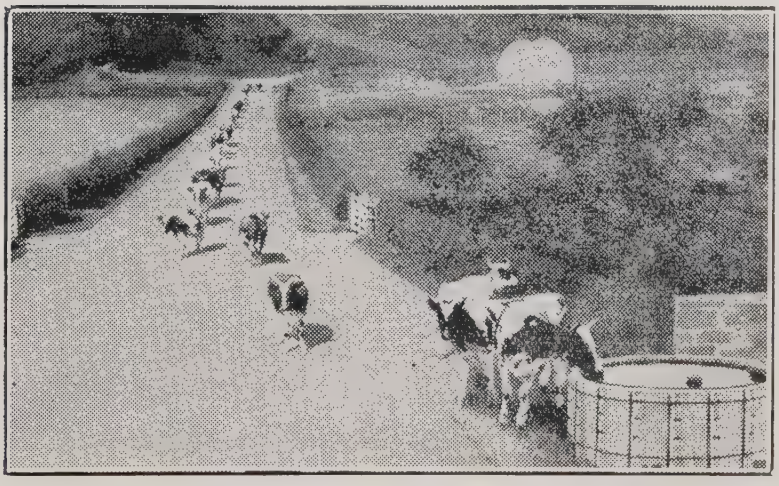

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The Breeding of Horses

PRICES for draught horses are still reported to be low, and it appears that the scarcity of labour makes it necessary to use tractors as much as possible, states the Director of the Livestock Division in his annual report. This position will probably remain, so long as fuel is available for the mechanical power, but, on the other hand, one would expect an increased demand for horses to enable owners to dispense with mechanised traction under the present conditions.

The operation of the Stallions Act should assist in the eventual elimination of the unsound stallion. So far, the Act applies only to the compulsory examination of the younger stallions—two- and three-year-old stallions—although many of the older stallions were examined for certificates of soundness the previous year.

In regard to the breeding of light horses, subsidies were again provided under the Remounts Encouragement Act. These subsidies enable the owners of approved mares to obtain the services of selected and approved stallions at reduced fees. The stallions were stationed at convenient centres in both islands, and 40 stallions were subsidised during the year 1940-41, compared with 39 in the previous year. The number of mares approved for service was 1381, compared with 1339 in the previous year. This service is still being well patronised.

Although some good reports have been received concerning foals produced under the subsidy scheme, some criticism has been raised in other districts. Favourable comment has been made in regard to many of the stallions used, but so far it has not been possible to exercise a close scrutiny or selection of the mares. A uniform type is not likely to be produced until Committees are able to exercise a more rigid selection of the breeding-mares. The use of old mares should be discouraged, as in this class the foaling percentage is low and the death rate at foaling-time comparatively high. Unfortunately, the number of mares offering does not allow of a strict selection in regard to type and other aspects.

The assistance given by the New Zealand Racing Conference, the New Zealand Trotting Conference, and other kindred bodies is much appreciated. The work of the District Remount Committees has been made more difficult during the year through the necessity for restriction of motor travelling.

Measurements of the amount of feed produced during the year by pastures in various districts throughout New Zealand and in several varying seasons have a direct application to farm practice and management. The following preliminary survey indicates the results which may be expected from this type of work, and the methods by which it is carried out. It should be noted, however, that the full value of this investigation can be secured only by a continuation of measurements over a large number of years.

GRASSLAND PRODUCTION in NEW ZEALAND

Measuring the Amount of Feed Produced by Pastures

— By —

A. G. ELLIOTT, Crop Experimentalist, and P. B. LYNCH, Assistant Crop Experimentalist, Fields Division.

FOR many years there has been a need for a more detailed knowledge of the production from pastures throughout the year, and for information concerning the species contributing to that production. This was particularly noticeable when the investigations concerning facial eczema began, for the rate of pasture growth at certain critical periods is in some way connected with the incidence of that disease. Consequently, in the years following the major outbreak in 1934-35, the development of a satisfactory technique was in progress, and when a useful method was discovered, several "rate of growth" trials were started.

Technique of Measurement

Pasture growth is probably the most difficult crop to measure under conditions approximating those of normal farm management. Unlike the wheat crop, for example, where measurement is restricted to **one** crop, pastures may be considered as a number of crops growing in association. Each pasture species has different times, rates, and habits of growth, and all are delicately balanced in the sward. The sward is extremely sensitive to changes in management, and as frequent cutting necessitates a drastic change, the mower has to be used with the greatest care. The kind and severity of stocking will also greatly influence the type of pasture and its production, and therefore the grazing management of the trials is important.

The methods employed in measuring pasture growth may be summarised as follows:—

(1) "Mowing and Grazing" Trials

These were developed by Mr. A. W. Hudson,* a former Crop Experimentalist to the Department, and the technique used involves the use of a pair of similar fields, the growth in one of which is mown and weighed, while that in the other is grazed. Mowings alternate with sheep grazings, so that after two mowings and weighings the sward is grazed and the production of the duplicate section is measured. This technique approximates that of intensive rotational graz-

*Hudson, A. W.: Imperial Bureau of Plant Genetics, Herbage Plants, Bulletin II, 1933, 21-35.

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A general view of a trial under the enclosure method, showing in the foreground an area recently mown and weighed and the frame placed on a new site.

Shifting the frame to a new site after mowing and weighing. Note the construction of the frame.

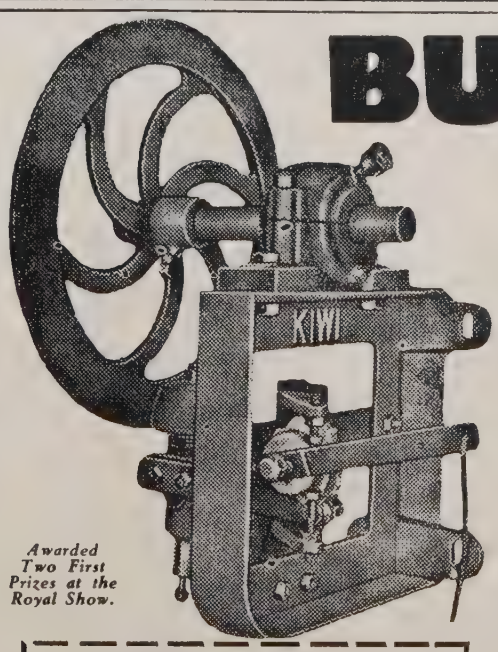
ing with sheep, and usually gives very high pasture production and stocking figures, indicating that it is a highly satisfactory method of management. Unfortunately, however, very few farmers could hope to maintain the sward in the condition in which it is kept in these trials, and therefore the technique is somewhat unsatisfactory as a means of studying pasture production under **normal** farm management. This is no reflection, however, on the usefulness of the method for comparing various pasture treatments.

(2) "Mowing Only" Trials

Under continued mowing without the return of clippings or the use of stock, the sward deteriorates rapidly with the ingress of weeds and the lowering of production. Returning the mower clippings, which usually quickly disappear from the top of the grass, will considerably prolong the period before the sward starts to deteriorate. However, in no way does this method approximate "normal farm management," and for this reason it cannot be considered satisfactory.

(3) "Enclosure Method"

Essentially, this method consists of erecting movable "frames" or "enclosures" (which are 11 ft. square or 11 ft. by 5 ft. 6 in.) in a paddock under good average grazing management, typical of the district and type of farming. The production of the area enclosed by the frame is measured by mowing, and then the frame is shifted



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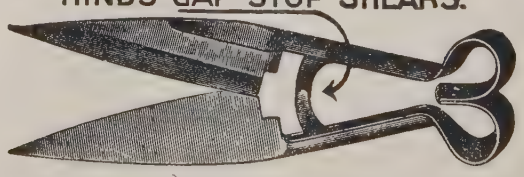

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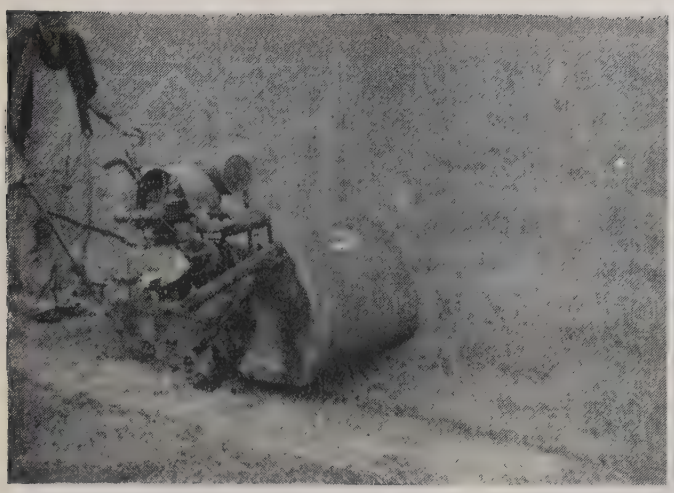

Trimming before replacing the frame prior to mowing and weighing.

Herbage inside the enclosure ready for mowing and weighing.

to a new site. This method involves the least change from standard farm management, and has proved very satisfactory both with sheep and dairy cattle grazing.

Frames are erected in pairs (in numbers sufficient to give accurate measurement) and from each pair one weight is obtained in the following manner. Let us suppose the frames are A and B:—

Jan. 10.—Frame A is placed in the paddock.

Jan. 17.—The herbage in frame A is trimmed to an even height with the mower. Frame B is "placed."

Jan. 24.—The herbage in Frame A is mown and weighed (giving production in the week Jan. 17-24), and the frame is shifted to a new site. The herbage in Frame B is trimmed.

Jan. 31.—The herbage in Frame B is mown and weighed and the frame is shifted. The herbage in Frame A is trimmed.

Such a technique enables continuous production records to be secured, and is applicable in practically any reasonably controlled field. In addition, it in no way interferes with the normal grazing of the field.

It will be noted that the technique allows the herbage to **recover** after grazing, and then to be **trimmed** to an even height before leaving for mowing and weighing. Both the recovery period and the trimming are deemed necessary to remedy the uneven height of pasture left after grazing, the recovery period ensuring that those areas grazed shorter than "mowing height" will recover to that height before production measurements are started. To some extent, this trimming technique interferes with the normal recovery after grazing, but it is essential for accurate records, and appears to exert a comparatively small effect.

With the rate of growth trials, cutting is made at **regular intervals** (usually about seven days). At certain periods there may be no growth to cut at such an interval, and in that case the fact is recorded, and the frames are left in position. Such a technique enables the fluctuations in growth rate to be more accurately measured than one in which cutting is made at a comparable **stage of growth** in each case. The latter method is commonly employed where the effect of various pasture treatments is measured. When the production data is examined in comparison with the known carrying capacity of the area, a satisfactory correlation has been found using standard English digestibility data and maintenance and production requirements for various classes of stock. This relation has been determined for different periods of the year. Allowance has always to be made for the incomplete utilisation of feed by stock.

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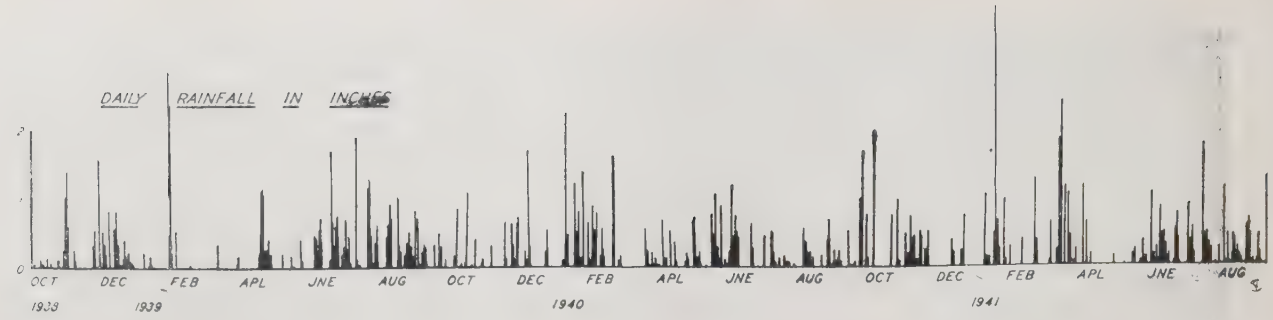
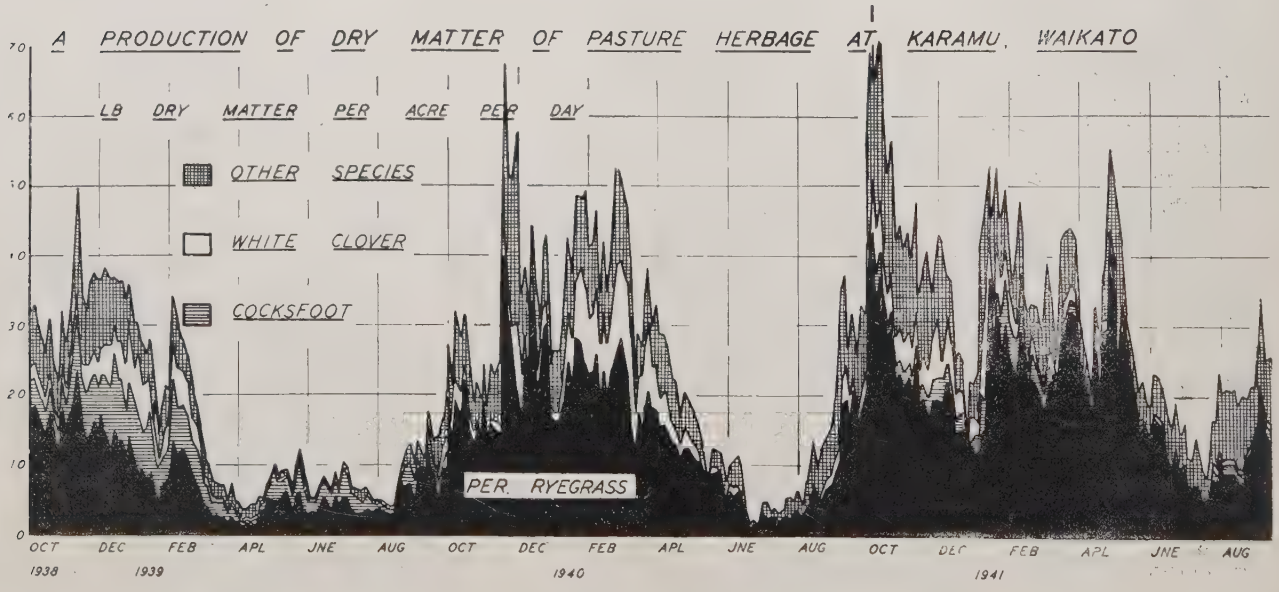
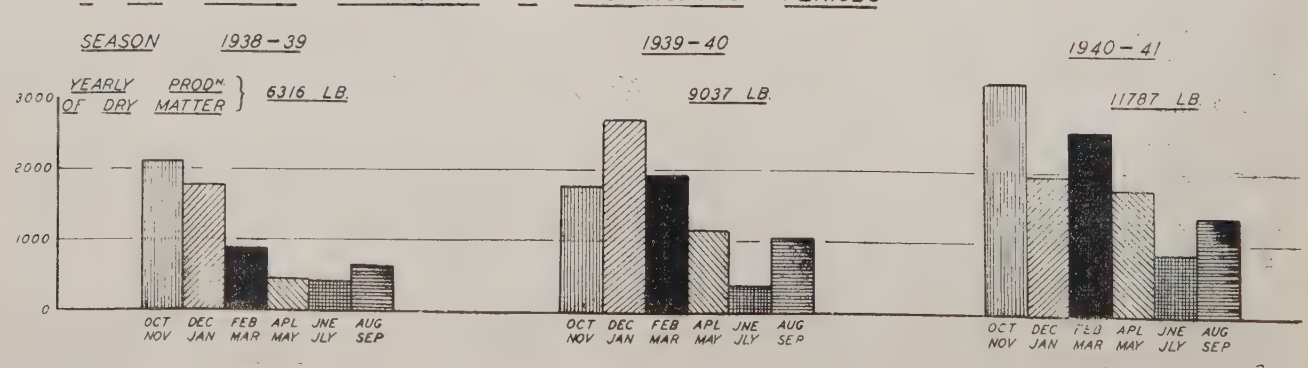

DAILY RAINFALL IN INCHES
OCT DEC FEB APL JNE AUG OCT DEC FEB APL JNE AUG OCT DEC FEB APL JNE AUG
1938 1939 1940 1941

DAILY 4-IN SOIL TEMPERATURES (DEG. F.)
NO DATA AVAILABLE

GRAPH 1


A PRODUCTION OF DRY MATTER OF PASTURE HERBAGE AT KARAMU, WAIKATO
LB DRY MATTER PER ACRE PER DAY
OTHER SPECIES
WHITE CLOVER
COCKSFOOT
PER. RYEGRASS
OCT DEC FEB APL JNE AUG OCT DEC FEB APL JNE AUG OCT DEC FEB APL JNE AUG
1938 1939 1940 1941


B. DRY MATTER PRODUCTION IN TWO-MONTHLY PERIODS
SEASON 1938-39 1939-40 1940-41
YEARLY PRODN. OF DRY MATTER
6316 LB.
9037 LB.
11787 LB.
OCT NOV DEC JAN FEB MAR APL MAY JNE JLY AUG SEP

Results from Rate of Growth Trials.

(1) Changes in Seasonal Growth Rate

In the "Journal" for June, 1941 (page 42) the authors have summarised the variations in seasonal production of a "mowing and grazing trial" over an eight-year period. Graph 1 in the present article deals with a rate of growth trial at Karamu (Waikato) which has been in progress for the past three years.

In graphs 1A and 2 the total production in pounds per acre per day is indicated by the top line and the production of each species which go to make up this total production fill the space between this top line and the base line. Thus, in Graph 1A for October 1, 1938, the sward was yielding 32 lb. dry matter per acre per day. This 32 lb. was made up of 18 lb. ryegrass, 4 lb. cocksfoot, 2 lb. white clover, and 8 lb. other species.

Unfortunately, the type of pasture in the field on which the trial was started was a leniently grazed ryegrass-cocksfoot-white clover sward. After the first year, the frames were shifted to a field carrying a dominantly ryegrass-white clover sward under reasonable sheep grazing. The graph illustrates this change in species composition, and the **total** production for the first year is therefore not strictly comparable with that of the remaining trial period. Nevertheless, the two most recent seasons have been highly productive in comparison with 1938-39, which was marked by a severe autumn drought. This is reflected in the production in each season, shown in section B of the graph and also in the following table.

PRODUCTION OF HERBAGE IN POUNDS OF DRY MATTER PER ACRE.

Season.	Total Yearly Production.	Production in Two-monthly intervals as a percentage of the Total Production.					
		Oct.-Nov.	Dec.-Jan.	Feb.-Mar.	Apl.-May	June-July	Aug.-Sept.
1938/39	6,316	33.6	28.0	14.0	7.2	6.9	10.4
1939/40	9,037	19.9	30.0	21.3	12.9	4.3	11.7
1940/41	11,787	27.7	16.5	21.8	14.9	7.5	11.7

In the article referred to above, five features of pasture growth were given, namely:

(1) The variation in seasonal production within each year.

(2) The variation in total production from year to year.

(3) The unreliability of the autumn flush of growth.

(4) A tendency for a summer slump in pasture production.

(5) The relative constancy of spring and winter production respectively.

With the possible exception that there is a greater tendency for variation in spring production in the Waikato, the rate of growth trial at Karamu confirms the above conclusions. The necessity for the conservation of surplus spring and summer production is shown by the fact that more than 70 per cent. of the total yearly production has, on the average, occurred during the months October to March inclusive. A similar state of

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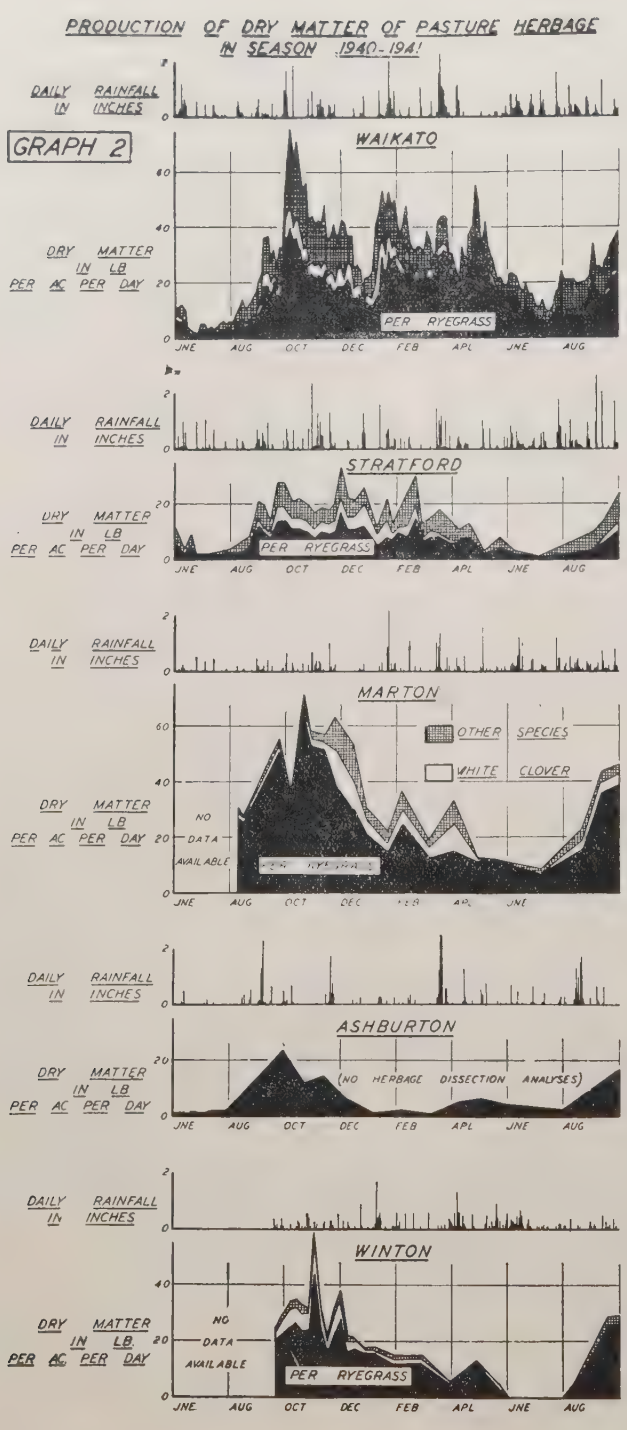

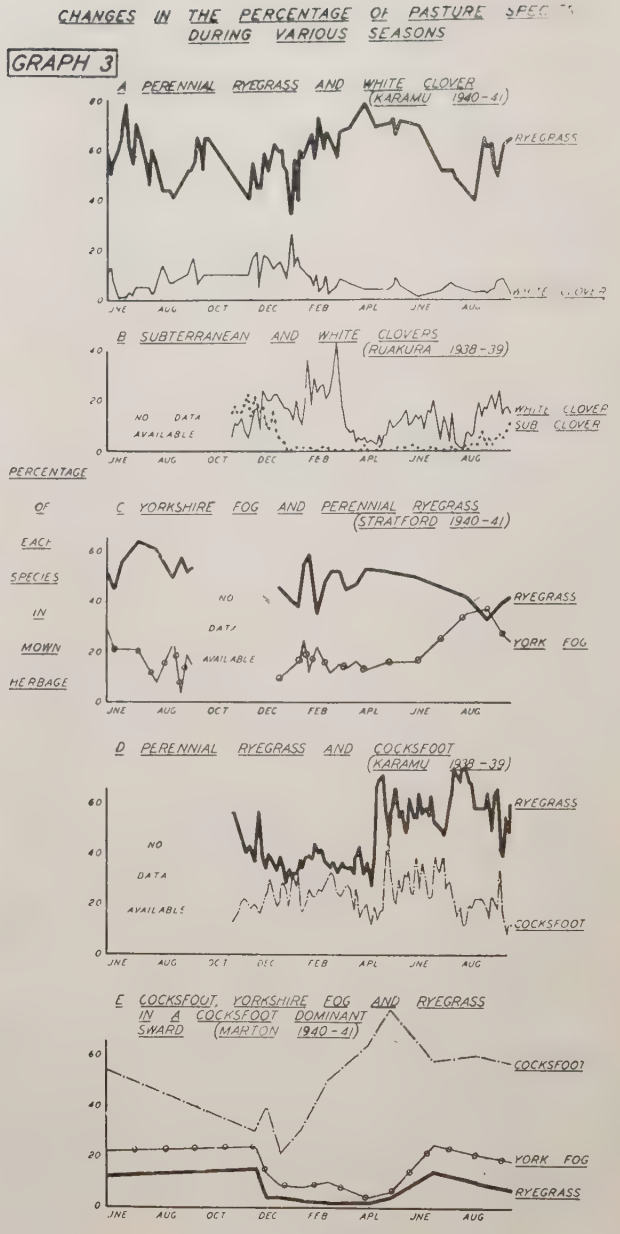
CHANGES IN THE PERCENTAGE OF PASTURE SPECIES DURING VARIOUS SEASONS
GRAPH 3
A PERENNIAL RYEGRASS AND WHITE CLOVER (KARAMU 1940-41)
RYEGRASS
B SUBTERRANEAN AND WHITE CLOVERS (RUAKURA 1938-39)
NO DATA AVAILABLE
WHITE CLOVER
SUB CLOVER
PERCENTAGE OF EACH SPECIES IN MOWN HERBAGE
C YORKSHIRE FOG AND PERENNIAL RYEGRASS (STRATFORD 1940-41)
YORK FOG
D PERENNIAL RYEGRASS AND COCKSFOOT (KARAMU 1938-39)
COCKSFOOT
E COCKSFOUT, YORKSHIRE FOG AND RYEGRASS IN A COCKSFOOT DOMINANT SWARD (MARTON 1940-41)

affairs exists in the majority of districts throughout New Zealand.

The effect of various meteorological factors on pasture growth has been closely studied, but the prediction of grass production by such means has proved difficult. In the Waikato, a critical level for temperature is about 50 degrees F. for the 4 in. soil temperature, which corresponds to a screen maximum temperature of between 55 degrees F. and 60 degrees F. This level needs to be attained before the marked spring rise in production occurs. Earlier work showed that in periods where rainfall is adequate, quite a close correlation exists between temperature and grass production. Thus, a 4 in. soil temperature of 55

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degrees F. at Ruakura might be expected to result in a production of about 20 lb. of dry matter of pasture herbage per day from a first-class sward, and a temperature of 60 degrees F. should give between 35 and 40 lb. of dry matter. The critical level of soil moisture has proved more difficult to determine, but it was found that moisture shortage was commonly associated with soil temperatures exceeding 65 degrees F., due to the rapid loss of moisture which occurs at such temperatures.

(2) Growth of Pasture in Different Districts

Graph 2 illustrates the differences in total and seasonal production in five localities in New Zealand. These trials may be considered to indicate typical production of the Waikato district, of the Stratford dairying district of Taranaki, of the Rangitikei plains at Marton, of average land in mid-Canterbury, and of good average Southland country as found at Winton. The season 1940-41, in which the comparisons have been made, was one of high production in the Waikato and Marton districts, and of average production in the other districts. In each case the swards were rather better than the average for the district, and the manuring was according to standard practice.

(a) Variation in Total Production.

In pounds of dry matter per acre for the period Oct. 1, 1940, to Oct. 1, 1941, the trial in the Waikato yielded 11,787 lb., that at Stratford 4,734 lb., at Marton, 11,071 lb., at Ashburton, 2,623 lb., and at Winton 6,269 lb. Mr. G. A. Blake, in the "Journal" for December, 1941, has analysed data from the Stratford rate-of-growth trial in relation to carrying capacity, and as a means of calculating the amount of hay and silage required for the periods of low production. He places the dry matter requirement of a cow producing 1 lb. of butterfat per day at 7,300 lb. per year. On this basis, the soil type in the Waikato (Horotiu sandy loam), on which the trial is located, should easily carry one dairy cow per acre, but in section 1 above it was shown that in a low production year only 6,300 lb. of dry matter were produced from this experiment. It is this latter figure which prevents even higher stocking figures than at present exist. With adequate conservation of hay and silage in the years of plenty, such as 1940-41, a carrying capacity of a dairy cow per acre on such land should be quite possible from the feed production point of view. Similarly, at Stratford it should be possible to carry one dairy cow to every 1½ acres. Although in the latter case additional data on the herbage production over several seasons is needed to confirm this, carrying capacities of this order have been attained by progressive farmers in the district.

The requirements of sheep for maintenance and production are still the subject of controversy. At Marton it has been found that dry sheep in a thriving condition will consume up to 3 lb. dry matter of pasture herbage per day.

English data* suggests that a milking ewe will consume up to 6 lb. of dry matter per day. This is probably too high a figure. As the ewe makes her greatest demands in periods of high pasture production, smaller quantities of supplementary fodder usually need to be conserved than on the dairy farm. On the balance, it appears that to carry a ewe and fatten a lamb on

*British Min. of Agric.: Bulletin 48: Rations for Livestock (1933).

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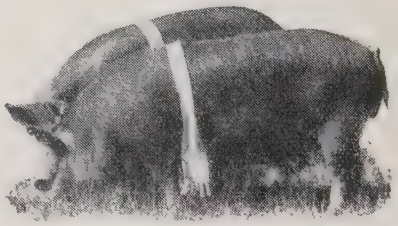

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grass about 1,500 lb. of dry matter per acre per year will be required. On this basis, it should be possible to carry six to seven ewes per acre at Marton, and this, in fact, approximates the carrying capacity of the Marton Experimental Farm, although it is higher than the average for the district. Similarly, at Winton a carrying capacity of four ewes per acre might be expected. Here, however, much greater provision has to be made during the long winter of negligible pasture growth, and considerable areas have to be devoted to the growing of supplementary crops.

In Mid-Canterbury (Ashburton district) 1½ ewes per acre can be carried with the use of supplementary crops, but with irrigation, the year's pasture production on this area was raised to 3,875lb. of dry matter, equivalent to approximately 2½ ewes per acre. Corresponding figures for the previous year at Ashburton were 1,060lb. of dry matter (less than one ewe per acre) on the non-irrigated area, and 4,900lb. of dry matter (more than three ewes per acre) on the irrigated section. This shows the unreliability of pastures in this district without irrigation.

(b) **Variations in Seasonal Production in Each District:**

Reference to Graph 2 will illustrate the following features of pasture growth in each district.

(1) **Waikato.**—This has been considered in Section 1 above. Seasonal growth is subject to most marked variation in this district.

(2) **Marton.**—In most respects this district shows similar fluctuations in seasonal growth to that of the Waikato, but there is probably a greater tendency for low production during dry summer and autumn weather.

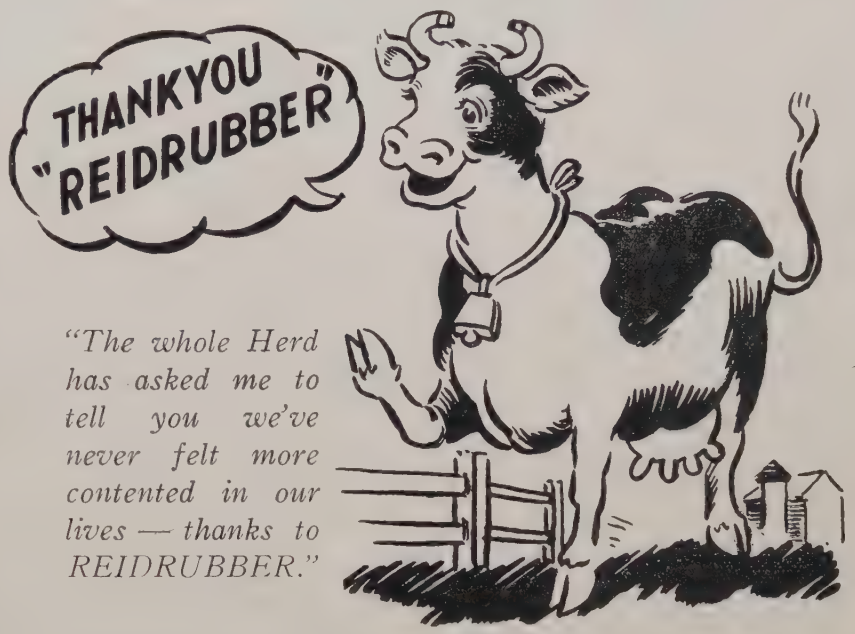
(3) **Stratford.**—In this high rainfall district, production is relatively stable from spring to autumn, although insufficient data is available to be certain of this in all seasons. The greatest variation is to be found in the length and severity of the winter period, as temperature rather than rainfall is the limiting factor in this district, much of which is at an elevation of 800ft. or higher above sea level.

(4) **Ashburton.**—Grass production on non-irrigated land is practically at a standstill for three or four months during the summer and autumn, and it is also negligible during the winter. As a result, the yearly production is low, and practically all the grass is produced in the spring months. The figures show that 60 per cent. in 1939-40 and 56 per cent. in 1940-41 of the total production took place in the months October, November, and December. As a result, the growing of supplementary crops is essential. Irrigation not only increases the total production, but also greatly improves the "spread" of production.

(5) **Winton.**—Both in respect of climate and of total grass production, this district is similar to Stratford. In proportion, however, as the following table shows, the spring production tends to be higher and the summer and winter production lower at Winton than at Stratford. This results in a long period of insufficient pasture growth, and the need for the supplementary crops is apparent.

GRASS PRODUCTION IN POUNDS OF DRY MATTER PER ACRE.

District.	Total Yearly Production 1940/41.	Production in Two-monthly Periods as a Percentage of the Total Production.					
		Oct.-Nov.	Dec.-Jan.	Feb.-Mar.	Apl.-May	June-July	Aug.-Sept.
Stratford ..	4,734	22.6	28.8	24.6	8.8	2.2	13.1
Winton ..	6,269	34.1	21.2	11.5	7.5	nil	25.7



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The value of the foregoing analysis would be much enhanced if the comparisons could be extended over a number of seasons, but, nevertheless, it has shown many weaknesses of pasture production in relation to stock requirements. No district can be considered safe in this respect. In addition, it has shown that the means by which carrying capacity can be increased and the stock adequately fed at all times of the year is to be found in utilising the peaks of production to fill the troughs. Particularly in the South Island, however, the lengthy periods of low production make it necessary to grow supplementary fodder crops in addition.

(3) Growth Period of Pasture Species

A typical pasture sward consists of a large number of different species of grasses, clovers, and weeds. The study of the production from each of these species, and the times they make such production, is of the greatest importance, not only in securing the maximum total production and "spread" of production, but also in keeping a proper balance between the species in order that they may make the most nutritious and safe stock feed. Graphs 1 and 2 indicate the **production** of the main pasture species in various districts, and Graph 3 shows the changes in the **percentages** of these species in the mown herbage based on dry weight.

(a) **Perennial Ryegrass.**—This is the most important pasture constituent in all of the trials and in all of the districts studied, and it is obvious that the bulk of the total production comes from ryegrass. Even where the sward contains a high proportion of other species, such as at Stratford, the production from such species is relatively small compared with that from perennial ryegrass. It is one of the first species to produce heavily in the spring, but production is relatively lower during the summer months, when it tends to go to seed and when clover growth is strong. The **percentage** of the species in the mown herbage, however, keeps fairly constant throughout the year.

The marked rise in the percentage of perennial ryegrass in the herbage as shown by Graph 3D at the end of April, 1939, may be traced to the renewed vigour of this species with the first rains after the severe drought period in the summer and autumn of 1938-39.

(b) **Cocksfoot.**—The rate of growth trial in the Waikato was on a ryegrass-cocksfoot-white clover sward during 1938-39. Graph 1 shows that the **production** of cocksfoot was fairly constant throughout the year, and the species made a substantial contribution to winter production, although the best growth occurred in the summer. Graph 3 shows that the **percentage** of this species in the mown herbage tends to increase in the winter months. The trial used for Section E of this graph is one in which swards of various types have been established, and are being managed in the most suitable manner for each of the dominant species concerned.

(c) **Yorkshire Fog.**—In the swards which we are considering this is a weed species, but nevertheless it is such a widespread plant that its contribution to pasture production cannot be ignored. The production from the species is relatively constant throughout the year, but it is the earliest grass to "come away" in the spring, as is shown by the percentage present in the herbage. (Graph 3.) In some cases this may be a valuable feature, but, plant for plant, its production is much inferior to that of the better pasture species of ryegrass and cocksfoot, and therefore it should be encouraged only where these superior grasses will not thrive.

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(d) **White Clover.**—The flush of white clover growth occurs from late spring through to the autumn. This is clearly seen in the graphs both of production and of the percentage of the species in the mown herbage. Early spring and winter growth tends to be clover-deficient, and late spring and summer growth may in some cases contain too much clover for its safe use as a stock feed. Consequently, lenient winter management to obtain grass dominance may be advisable in dairying districts where cows are liable to "bloat." In most districts, however, the aim is to increase the clover in the pasture, not only because it is an essential element in a balanced sward, but also because it is a most highly nutritious plant, which is unsuitable to stock only when fed in an unbalanced ration.

(e) **Subterranean Clover.**—Information concerning this species is available from one trial at Ruakura during the season 1938-39 only. (Graph 3B.) In this pasture, which contained a considerable amount of the species, subterranean clover yielded more than white clover during the early spring months and until November, when white clover was rapidly attaining maximum production. There was a negligible amount of subterranean clover after flowering in December until the autumn seedlings appeared in February. Due to the very dry season, however, the autumn re-establishment was poor. It has been shown by this trial that subterranean clover growth replaces that of white clover when the latter is comparatively dormant, and therefore the period of good clover growth in the sward is considerably extended by its use. The difficulty, however, is to get the two species in the one sward, because a strong white clover growth will usually prevent effective re-establishment of subterranean clover in the autumn.

(f) **Other Species.**—This article does not allow of an investigation into the minor elements of the sward, but these vary greatly in amounts and times of production throughout the year.

Conclusions

In this article only a small part of the information which may be obtained from the data concerning the rate-of-growth trial has been presented, but no doubt it will have been sufficient to show the value, scope, and practical application to which the information may be applied. Both the field technique and the method of presentation of the data is original work in New Zealand. It has proved to be not only practical in the field under a wide range of farming and climatic conditions, but also gives accurate results of great value in grassland research. For a complete survey of grassland production in New Zealand many more trials are required, and each should be conducted for a minimum period of five years. The value of such a survey should be obvious from the material now presented, and should be of considerable assistance not only to research workers and field officers, but also to all engaged in grassland farming in the Dominion.

Acknowledgments

This investigation has been a truly co-operative effort, in which a number of officers of other Departments have been intimately associated. Of these, the dissection of the mown herbage into species components carried out by the Grasslands Division, Department of Scientific and Industrial Research, has provided fundamental data. The chemists of the Animal Research Division at Ruakura, of the Plant Chemistry Laboratory, Palmerston North, and of the Fields Division, Wellington, supplied dry matter figures from herbage samples. The meteorological data was furnished by officers at Ruakura and Wellington, and by Mr. K. M. Dalrymple, Bulls. The officers of the Public Works Department assisted with the irrigation trial near Ashburton. Finally, much of the value of the results secured has been due to the careful and painstaking field work of instructors of the Fields Division and officers of the Animal Research Division.

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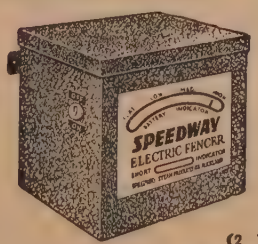

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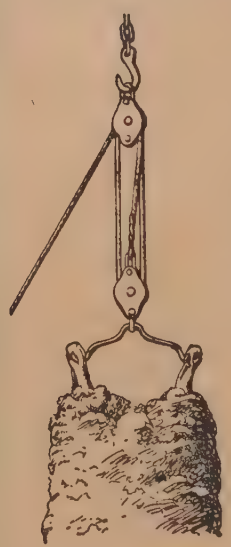

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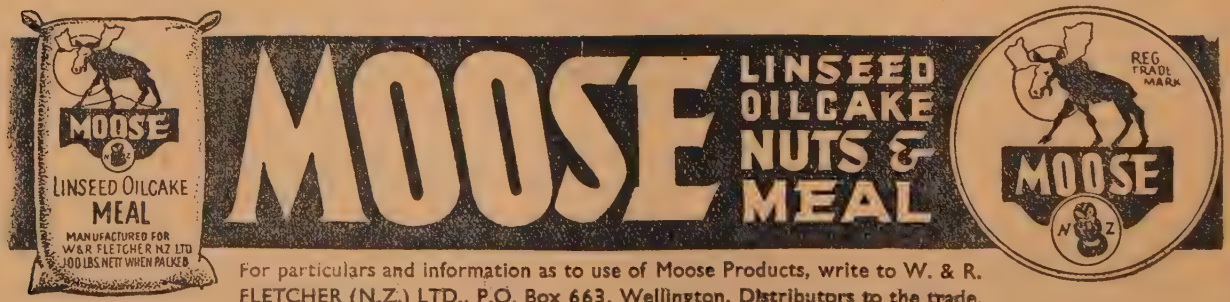

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Pig Feeding Trials on Sugar Beet And Minerals

By

M. J. SCOTT,
Superintendent of the Pig Industry, Wellington.

WHENEVER opportunity offers, the Supervisors of the District Pig Councils make arrangements with farmers to carry out pig-feeding trials on the farmers' property. These trials are usually made to find an answer to the question that is most urgent on that particular farm. In the September issue of the "Journal" nineteen trials were reported on. They dealt chiefly with copra and whey problems. Four more are now reported, one dealing with sugar beet to weaners and three with the value of minerals.

Trial No. 20: Sugar Beet to Weaners (Pukekohe).

Eight weaner pigs by a Large White boar from a crossbred sow were fed in a sty with practically no run-out for 56 days. Their average weight was 28lb. at the beginning and 78lb. at the end of the trial. The resulting carcass increase, 33lb. at 6½d. per lb., is worth 17s 11d per pig. Feeds used in this period were 38 gallons of milk, 28lb. of copra, 10lb. of maize, and 245lb. of sugar beet, at a total cost of 4s 8d per pig. The difference between this amount and the value of the carcass increase, 13s 3d, gives a return of 4.2d per gallon for milk used. For every pound of carcass gain, 4.2lb. of feed units were eaten, and the meal and roots portion of this cost 1.68d. Pigs grew at the rate of 0.91b. daily.

In this trial feed has been used most efficiently, and this is the main reason why the returns per gallon of milk are so high. The trial shows that when half the feed supplied is of concentrate quality little pigs do exceptionally well on sugar beet, and sugar beet can show as high a feeding value as is usually claimed for it. These pigs were fed in a sty, and, because of bad weather, were allowed a run-out only during one week. Subsequently, on skim-milk and copra, they grew 97lb. in 91 days. Quantities of feed available over the final fattening period are not available.

In calculating the return for skim-milk above, sugar beet has been costed at 5s per ton. If, on the other hand, skim-milk is costed at 1½d per gallon and the difference between feed costs and the value of carcass gain is credited to sugar beet, the sugar beet has a value of £4 2s per ton, which is about four times its usual value.

Value of Minerals

The three trials which follow were designed to test the value of minerals fed to pigs which were getting a liberal meal allowance along with skim-milk. Generally, there is no attribute of a feed supply more difficult to assess than the value of minerals. They show to advantage when their addition encourages animals to eat more freely, thus correcting conditions due to a low feed intake, or when their

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addition improves the health of the animal whose feed intake is adequate, but which is showing signs of paralysis and kindred ailments due to an inadequacy of minerals.

On a generous mixed diet, such as used here, neither of these conditions prevails, and it would be surprising to find that the feeding of minerals was advantageous. Nevertheless, there are differences between these lots both in the efficiency of feed conversion and in the returns given for the basic diet of skim-milk. The trials should be repeated and notice taken of them only if the same kind of results are obtained again.

Trial 21: Control—No Minerals (Pukekohe).

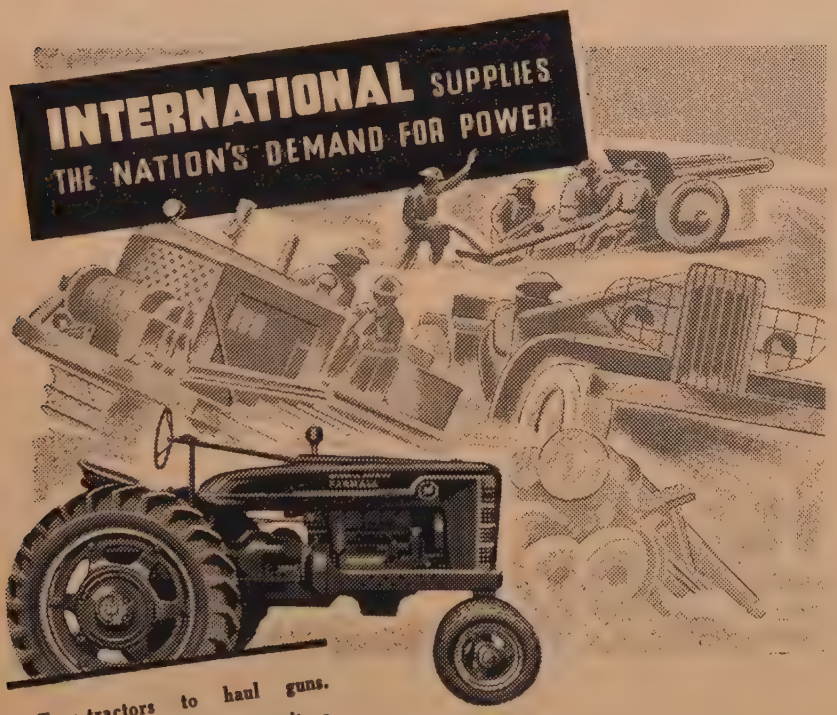
Five Large White and Large White cross pigs were fed in a sty for 76 days. Their average weight was 114lb. at the beginning and 192lb. at the end of the trial. The resulting carcass increase, 62lb. at 6½d per lb., is worth 33s 8d per pig. Feeds used in this time were: 163 gallons of milk, 152lb. of meal, 24lb. of copra, 21lb. of molasses, and 3lb. of fat per pig, at a total feed cost of 23s 11d. The difference between this amount and the value of the carcass increase, 9s 9d, gives a return of 0.72d per gallon for 163 gallons of milk used. For every pound of carcass gain, 6.01lb. of feed units were eaten, and the meal portion of this cost 4.62d. The pigs grew at the rate of just over 1lb. (liveweight) daily.

Trial 22: Minerals—Proprietary Mixture (Pukekohe).

Five pigs from the same litters as the last lot were fed for 73 days from an average liveweight of 125lb. to a final weight of 204lb. The resulting carcass increase, 62lb., at 6½d per lb., is worth 33s 8d per pig. Feeds used during this time were 152 gallons of milk, 156lb. of meal, 21lb. of copra, 24lb. of molasses, 3lb. of fat, and 1s 7d worth of minerals per pig, at a total cost of 25s. 11d. The difference between this amount and the value of carcass increase, 7s 10d, gives a return of 0.62d per gallon for the milk used. For every pound of carcass gain, 5.84lb. of feed units were eaten, and the meal portion of this cost 5.04d. The pigs grew at the rate of just over 1.1lb. liveweight daily.

Trial 23: Minerals—Home Mixture (Pukekohe).

Five more pigs from the same litters were fed for 80 days from an average liveweight of 105lb. to a final weight of 191lb. The resulting carcass increase, 66lb. at 6½d per lb., is worth 35s 8d per pig. Feeds used during this time were 165 gallons of milk, 151lb. of meal, 26lb. of copra, 22lb. of molasses, 3lb. of fat, and minerals worth 5d per pig, at a total cost of 24s 4d. The difference between this amount and the value of the carcass increase, 11s 4d, gives a return of 0.82d per gallon for milk. For every pound of carcass gain 5.64lb. of feed units were eaten, and the meal portion of this cost 4.44d. Pigs grew at the rate of just over 1lb. (liveweight) daily. As previously stated, the trials are inconclusive, and check trials will be arranged if possible. A similar trial using more skim-milk and less meal will be carried out. The effect of minerals on breeding sows may also be attempted if opportunity offers.



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Alternate dosing is recommended between COOPER'S N.C.A. (Nicotine, Copper-Sulphate), and COOPER'S WORM DRENCH. (Both Registered pursuant to Stock Remedies Act, 1934).

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Dosing is often as important as dipping!

The Horse Returns

He Will Repay Being Well Looked After

Contributed by the
LIVESTOCK DIVISION

NO doubt the restriction on the use of petrol will encourage many people in country districts to look about to see what use can be made of ponies and horses to overcome transport and haulage difficulties. Where grazing is available, the horse will prove very useful for many jobs formerly carried out by motor-power. In the rural districts the feeding and stabling should not present the same difficulties as in the larger centres, but the problem of obtaining suitable saddlery and harness will be a real one unless the horse is to be used for saddle purposes only.

The selection of the horse will depend upon the nature of the work it is intended to carry out. The horse may be required for draught purposes, for riding purposes, or for driving. Many horses acquired for any of the above purposes will be found to be big and soft, having been running on good pasture at this season of the year. Many will be in a fat bodily condition, and generally look pleasing to the eye. However, fatness is not fitness, and consequently a good deal of preparatory exercise, training, and correct feeding will be required to get the animal into good working condition. The first tendency will be to remove all soft, flabby fat, and through exercise and work the animal will gradually be built up into a fit and muscular condition suitable for the type of work required.

Grooming and Feeding

During the early stages the soft, grass-fed animal will perspire freely at all exercise and light work, and this will consequently entail the necessity for regular grooming to keep the skin in a clean and healthy condition. Grooming is much neglected by owners, and its cleansing and stimulating effect on the skin of the animal is not fully appreciated. It has been stated that a good grooming daily is as valuable as a feed of oats, and everyone knows the value of oats in the feeding of horses. Because of the difficulty of getting grass-fed horses on to dry feeding, such as chaff, hay, or oats, a certain restriction on the amount of grazing may be required. It may be necessary to put the horse in the barest paddock available, where the enclosure may be used more for shelter, exercise, and freedom than for actual grazing purposes. A good, clean, wholesome water supply should always be provided, especially if the horse is on dry feed.

A period of several weeks will be necessary to get the grass-fed horse into a fit and working condition. Extra time spent in this preliminary preparation of the animal will prevent many disappointments later on, as an unfit animal is subject to many ailments which may be avoided if a suitable preparation is carried out. It is not expected that each owner will go into the detail necessary by the trainer of the thoroughbred, where a very high degree of physical fitness is called for. On the other hand, one frequently sees good horses being used for work for

Cobaltised N.C.A.
WORM DRENCH

Is a treatment of proved value for **STOMACH, INTESTINAL, TAPE** and **WIRE WORMS** in sheep and lambs.

It contains Copper Sulphate, Nicotine Sulphate, Arsenic and Cobalt, and is TONIC as well as an EFFICIENT WORM DESTROYER.

Price 7/6 for 672 lamb doses or **4/6 for 336.**

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which they are not fit, and consequently many breakdowns, many lamenesses, and much impaired usefulness is seen.

Subject to Disease

The overfat horse put into the mowing machine for several days' heavy work may be the subject of many ailments and diseases. A common sequel is laminitis, or more commonly spoken of as founder. As the name implies, this is an inflammation of the sensitive laminae inside the hoof. The condition is most painful, the horse being frequenly unable to walk in the acute stage of the disease. Attempt is made by the horse to take the weight off the inflamed sensitive laminae by standing on the heels of all four feet. Consequently, the forefeet are well out in front, and the hind feet are pushed forward well under the body. When the acute stage has passed there is a tendency for the soles of the feet to drop, and the horse remains permanently impaired because of flat feet and ringing of the hooves. The small pony is also liable to this condition because of its tendency to become excessively fat even on comparatively bare pastures.

The unfit horse is very susceptible to sprains and strains of ligaments and muscles. It has been stated that the heart muscles are frequently strained when grass-fed horses are used periodically for a spell of severe sustained heavy work, such as mowing. Shoulder and saddle sores are also liable to be troublesome in the soft animal as against the fit horse. Just as training is necessary for the athlete to enable him to give of his best, so is training necessary for the horse. The well-groomed, well-fed team in a fit condition can do a tremendous amount of work day after day under reasonable care and management.

Although the tendency of late years to replace the horse by the motor has to a great extent prevented the opportunity for young men to acquire and develop the knowledge necessary in the sound management of horses, there is no reason to despair if common-sense methods are followed. The term "horse-sense" is frequently used to describe the ease with which the average horse becomes accustomed to his surroundings and work, and it remains for man to carry out his duty to a useful, faithful, and intelligent animal.

Individual Needs

Horse management covers such a wide field that it is not possible to deal with the subject fully, so that general lines must be followed. The needs and requirements of animals differ, however, and the study of each animal's peculiarities in regard to feeding and management is well recognised by all good horsemen. Thus, it has been found that a horse may be subject to repeated attacks of colic under one manager or on one farm. When the same animal is removed to another farm where the system of feeding and management is different, the attacks of colic disappear completely. The knowledge of how to deal with such

Today it is even more essential that you take proper care of your stock. Particularly your horses—their good health is vital to you. The very existence of your farm may depend on them. Therefore, give them the attention they are entitled to.

SALTONA

Recommended for Horses and Cattle. Helps to keep Horses in good condition and buoyant health. Makes the coat shine like velvet. Saltona coaxes the appetite and quickly prepares cattle and horses for show or sale.

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is an effectual dressing for Sprains, Stiffness, Rheummatism, Swollen Joints and Sinews, Wind, Galls, Curb and Splints when forming and whenever the shin is UNBROKEN.

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propositions is acquired through a study of the individual habits and requirements of the animals under care.

It is advisable to endeavour to find out the cause of any individual weakness, when steps should be taken to prevent it. This individual treatment rather than mass treatment is more likely to give the best results in horse management, as in the latter case attention to detail may be lacking. Thus, in feeding, guesswork may be used instead of actual weighing of feeds and rations. Too much is frequently as harmful as too little. Regularity in watering and feeding is desirable.

Clean, wholesome feed should always be provided. The horse is sensitive to musty and dusty feeds or food contaminated with vermin. If horses are on hard feed all week, a laxative green diet will be relished at the weekend. All changes in feeding, however, should be carried out very gradually so as not to cause indigestion and bring about cases of colic. If the feed is dry and dusty the addition of molasses in water sprayed on the feed may make it more palatable and more digestible. The addition of linseed jelly, prepared by steeping linseed overnight in water, will assist in bringing up the coat in the horse being prepared for show purposes.

If a horse is losing condition an examination should be made to find out the cause. If young, the animal may be infested with worms, and may require suitable worm treatment. In an older animal, faulty teeth and faulty mastication of the food may result in loss of flesh. Here, again, dental irregularities need to be attended to, and possibly a change in the diet may be necessary. The use of crushed oats may give good results where whole oats are not being properly masticated and digested.

In the general study of horse management there is quite a big field of useful and exacting detail to be acquired by those interested in the subject. Moreover, the care and management of all classes of animals is interesting, and applies in greater force to any person who has anything to do with horses.

Answers to Correspondents

Blood in Milk

READER (CROMWELL):—

As there is no veterinarian near, I am writing to you to inquire what is the trouble with my cow. She is a Jersey—second calver, came in in October, and is milking very well, only she seems to have trouble in one of the back teats. It is an effort to get the milk, although it is in full supply. The milk appears quite normal, but I noticed a little blood around the separator bowl which contains the discs. The cow appears healthy, although not in great condition. She

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SHEEP DRENCHES

PREMIER PRODUCTS LTD. HUDDART PARKER BLDG. WELLINGTON

has never been an easy cow to milk, but it is only this last fortnight that the back teat has gone back. The udder is not hard or inflamed.

LIVESTOCK DIVISION:—

The presence of blood in the milk is not an uncommon condition, and is due to the rupture of small blood vessels in the udder. Recovery is sometimes delayed a week or two, but in most cases the condition clears up without any permanent injury to the udder. The hardness in milking is probably due to a certain amount of stricture in the teat canal. Handle the udder gently when milking and watch the quarter for any inflammation or change in the milk, as these quarters are liable to develop mastitis.

Swelling in Rectum of Pig

R.3 (SOUTHLAND):—

I would be very grateful if in your next issue, through your veterinary notes, you could explain the cause of an enlarged swelling coming out of the rectum of a pig, as though the back passage has slipped. Do you think overfeeding is the cause? They have been fed on plenty of skim-milk, the froth being drained off.

LIVESTOCK DIVISION:—

The pig is suffering from prolapse of the anus and probably some portion of the rectum. The primary cause of the trouble is straining, which may be induced by diarrhoea, constipation, increased abdominal pressure, possibly due to overfeeding with certain types of food, or anything causing inflammation of the rectum.

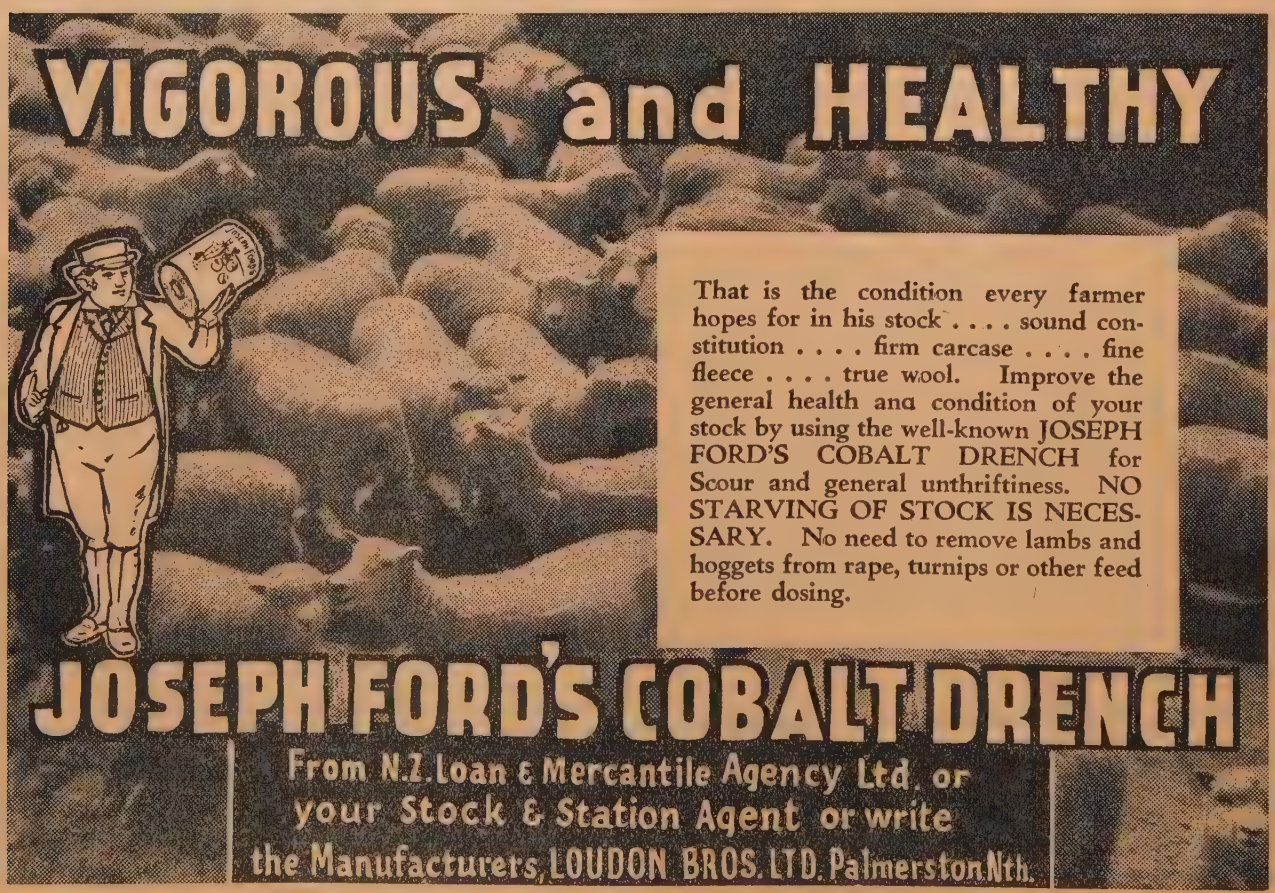
From the above you will readily understand the cause of the trouble, and you should have no difficulty in preventing it in future. Overfeeding, which you mention, is a cause, especially with voluminous food such as skim-milk or whey.

The successful retention of the protruded mass will depend upon the length of time it has been out and whether it has suffered any damage. Raise the hindquarters of the pig, clean the prolapsed mass, smear it with vaseline or liquid paraffin, and then by gradual and careful manipulation replace it in the normal position. Complete reduction is necessary, otherwise the prolapse will recur.

If it will not remain in position you may be able to carry out the following direction:—Reduce the mass as above, and then, using a light bagging needle, insert a purse string stitch through the skin all round the anus (the stitch goes in and out all round) at about ½ inch from its border, leaving an orifice sufficiently large for the passage of faeces. The stitch may be tightened or loosened at will. This method is very effective unless violent straining ensues, when the stitch material may cut through the skin.

Advisory Service on Veterinary Matters.

Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.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Why Sow Rubbish?

Sowing Cheap Seed Is a Waste Of Time and Money

By

A. V. ALLO,
Instructor in Agriculture,
Tauranga.

IN spite of all that has been said and written upon the subject of cheap grass seeds, there are still farmers who are attracted by the thought of "special pasture mixtures" at the price of 6d. a pound. In taking advantage of man's human weakness for something cheap, the cheap-seed merchant has caused farmers considerable financial loss, and has directly been the cause of production that is, in many cases, considerably lower than should be the capacity of the land.

The damage that this traffic does annually to our farming industry cannot be calculated in terms of money alone. The best customers for the "cheap" lines of seeds are often farmers in a low financial position, who grasp at the straw of cheapness in an endeavour to keep down their costs. Such seeds rarely, if ever, give a satisfactory pasture, so that the farmer is left in the position of having a paddock that is not pulling its weight in the production programme of the farm. He has to decide whether to plough and resow, or whether to try and build up to a productive sward by topdressing and management. Both methods cost time and money, and in these days of fertiliser restrictions the latter method is, in any case, not practicable. One farmer near Tauranga told me last year that he would have had to walk off his farm had he continued to use cheap seed. This is far from being an isolated example. Let the reader think of any farmer who is grassing down country with success, and the odds are that he is *not* using cheap seed.

There are other dangers in the cheap seed trade. Many of our common weeds are impurities of the cheap seed mixtures, so that a farmer using such seed is risking introducing many new weeds into his country.

The cheap seed merchant gives no guarantee of purity, germination, composition of the pasture mixture, type of seed, or freedom from weeds or rubbish.

Typical Cheap Seed

Let us consider the case of a typical seed mixture purchased on the open market from a firm that has specialised in the cheap seed trade. A sample of this seed was sent to the Seed Testing Station at Palmerston North for analysis, and the following report was furnished:—

	Pure Seed Per Cent.	Germination Percentage.
Perennial ryegrass	63.6	64
Red clover ..	10.9	46
White clover ..	8.3	20 + 33% hard seed
Italian ryegrass ..	4.5	60
Timothy	2.6	90
Cocksfoot	2.2	50
Crested dogstail ..	1.6	27
Browntop	1.0	57
Suckling clover ..	1.5	31 + 60% hard seed
Also lucerne and yarrow		
Weed seeds (ribgrass, hairgrass, soft brome, sweet vernal)	1.1	
Straw, chaff and inert matter ..	1.7	

In his remarks the Seed Analyst stated that the perennial ryegrass was of a very poor, temporary type, while the white clover was of a fair type.

Three Trials

To demonstrate how this mixture would do under normal farming conditions, three demonstration experiments were laid down last autumn, in which a plot sown with the above mixture at 40 lb. per acre was compared with plots sown with a standard

JAVA SOLID MOLASSES
Contains approximately:
60% Carbohydrates
12% Minerals
5% Protein
IDEAL FOR USE AS A
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A Well LIGHTED HOME for Next to Nothing

Enjoy a lighted home equal to city residents, with your own lighting unit. While your milking engine is running it can be providing electric power at next to nothing! Write for our catalogue and full instructions and you can install your own electrical system.

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ELECTRIC BULBS—We have ample stocks of 6, 12, 18 and 32 volt bulbs to provide our customers with their usual requirements.

mixture of certified seed sown at 40 lb. and 20 lb. per acre respectively.

After being down nine months, the following is the position on each of the three trials. The certified seed plots have a very vigorous sward of grasses and clovers, with very few weeds. The plot sown at the heavier rate of seeding has a denser and more vigorous sward, demonstrating the necessity of an adequate seeding. The plot sown with the cheap seed is markedly inferior to the other two. The ryegrass is yellowish in colour and very spindly, clovers are sparse, weeds plentiful, and there is a great deal of bare ground. As one farmer who saw the plots remarked, "This is the finish of cheap seeds for me."

There is no getting away from the fact that the only person who profits from the sale of cheap seed is the merchant who sells it. The farmer who sows it is damning the future of his pasture from the beginning. He may, after a period of years, and after heavy topdressing, be able to develop a fair type of sward, but at too great a cost.

Quality pays the best dividends, and the only way to get good results from a pasture is to sow good seed. This has been proved by experienced, practical farmers time after time. The wise farmer no longer is tempted by such catch phrases as "cheap mixture," "good utility mixture," and so on, but demands to know what he is sowing. Cheap seeds bring weeds, bare ground, poor pastures, low production and ultimate ruin. To get good pastures sow good seed. It pays.

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U.S.A. Opinion of N.Z. White Clover

THE New York agents of Wright, Stephenson & Co. Ltd. furnished the U.S.A. Department of Agriculture with certain samples of white clover from New Zealand, and they have received a letter from Dr. E. A. Hollowell, Senior Agronomist, in which he writes as follows:—

"You will be interested to know that most of the State Agronomists located in sections where white clover is an imported crop have had very satisfactory results in using New Zealand seed. Generally, it has been more productive than Kent wild white, and has lived just as long under the conditions where tested. If all of our foreign white clover seed was of New Zealand origin, farmers would be benefited considerably by that seed source over seed from other places."

Radio Broadcasts

ARRANGEMENTS have been made for radio talks to farmers to be delivered from Station 1YA, Auckland, at 7.15 p.m. on each Monday as from March 16. The following is the programme for the coming month:—

March 16.—"Some Comments on the Farming Position," by J. M. Smith, Fields Superintendent, Department of Agriculture, Auckland.

March 23.—"Y.F.C. Notes," by E. B. Glanville, Secretary, Auckland Council, Y.F.C. Federation.

PIG INDUSTRY BROADCASTS.

THE following programme of radio broadcasts will be given under the auspices of the National Pig Industry Council during March:—

1YA.—March 19, 7.15 p.m.: "Supplementary Feeds (Meal) for Pigs," by Mr. A. Longwill, Supervisor, Auckland District Pig Council.

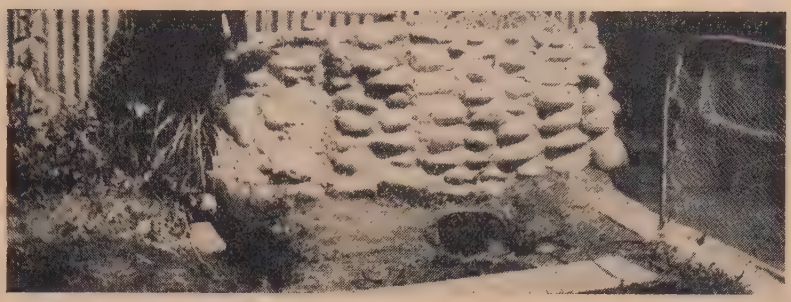
2YA.—March 3, 7.30 p.m.: "Feeding Pigs in Winter," by Mr. C. H. M. Sorensen, Supervisor, Taranaki District Pig Council.

3YA.—March 19, 7.15 p.m.: "Common Ailments of Pigs," by Mr. H. W. McIntosh, Supervisor to Canterbury District Pig Council.

Speedy Method of Making Humus

THE value of organic waste material and the method of composting this material has been described in the December, 1941, number of the "Journal" by Mr. A. M. Lee, Fields Instructor, Whangarei.

A system of composting using the same layering as described in this article has been evolved by Mr. E. T. Petty, New Plymouth, but in this system the actual process of decomposition is hastened by allowing air to be drawn through the material by means of air vents in the bottom of the pit or container. Actually, the system is the same as that for a slowly burning fire, when the general practice is to hold a newspaper across the fireplace, causing an inrush of air through the grate and a stimulation of the fire itself. Thus, the air vents in the bottom of the humus-making plant are only large enough to cause an indraught of air, with a consequent stimulation of the heating process and of the bacterial action. With large air vents, it has been shown that the decomposition of waste material has been slowed down to some extent.



A view of the humus-making plant, showing the passages leading into the air vents in the bottom of each container.

The Plant Itself

Mr. Petty's humus-making plant is constructed of cement and boulders, and is 8 feet long by 3 feet wide and 2 feet 9 inches deep. The plant is divided midway by a partition, and in the bottom of each pit or container a 12-inch square is dug out of the earth and covered with heavy wire netting. Leading to the outside from each 12-inch square is a pipe. Mr. Petty uses old drums with the ends cut out, but a 9-inch pipe is considered ideal for this purpose. Fig. 1 shows the whole plant with the air pipes leading through to the air vents in the bottom of each container.

Procedure Adopted

Material is placed in one container in layers as described by Mr. Lee, and in a fortnight to three weeks is turned into the other container when the first is filled again. At the end of a month to six weeks the first lot of material is completely broken down and is ready for use. Fig. 2 shows the two containers, one with fresh material and the other with completely broken down material. Included in the waste matter used in this plant are wood shavings and sawdust, and although these have not been used in any quantity, they have disappeared and been completely broken down.

For the average gardener the plant described is ideal, but for market gardeners and others larger plants could be installed, depending on the size of the farm or garden and the amount of waste material available. Without doubt, this is a rapid method of making humus, and many institutions, such as bowling and golf clubs, county councils and schools, are installing such plants for the transformation of waste organic material into humus.

—J. M. HOPKINS, Instructor in Agriculture, New Plymouth.

A close-up of the two containers, showing the fresh and completely broken down material. The latter had been in the plant just six weeks when the photograph was taken.

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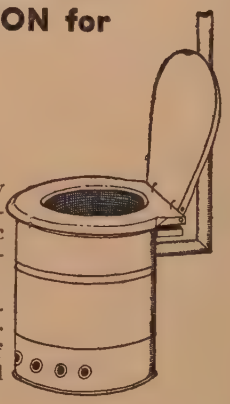

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Pampas Grass Can Be Killed By Too Frequent Cutting

DURING last summer the question was raised by a Martinborough farmer as to whether his young pampas plantation would stand grazing in the summer, should this ever be necessary. It was, of course, not expected that pampas grass could replace turnips or green lucerne for milking cows, but, on the other hand, under severe drought conditions if no other feed were available, the pampas would undoubtedly be of value.

The point at issue was really whether the plants would survive if cut back during dry weather. In order to test the point, two plants were cut—one to within about 3 inches, and one to about 9 inches of ground level. Although no rain fell during the next three weeks, both cut plants made extraordinary growth (Fig. 2), produced 15 to 18 inches of leaf, and appeared to be none the worse for their trimming.

Shortly after the photographs were taken, however, occasion arose (during March) to graze the area lightly. The stock again severely trimmed the fresh growth of the two cut plants, with the result that the one cut short died out completely and the one cut higher, even by November, had produced only two or three weak shoots.

The vital importance of rotational grazing of pasture in order to provide plants with a "breathing space" is fairly well appreciated, and the same principle applies even more strikingly to the grazing or cutting of pampas grass. Whereas in the case of pasture, spells of one to three weeks may suffice, one would strongly recommend that pampas grass be grazed hard no more than twice a year.

—*N. LAMONT, Instructor in Agriculture, Masterton.*

Pampas grass on the property of Mr. S. W. Martin, Martinborough, photographed in February, 1941, when the plants were in their second summer.
[N. Lamont, photo.

One of the cut plants on Mr. Martin's farm, showing three weeks' recovery during February, 1941.

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Two Types of Home-made Cream Barrows

IT has been said that the greatest benefactor of the human race was the unknown inventor of the wheel. Even in the humble but important job of starting the cream on the road to butter, the wheel is made to play its part, and the diversity of pattern shown in the various home-made cream conveyers is a striking tribute to the well-known ability of the farmer to "improvise something."

The cream barrow used by Mr. Hudson. Note the simplicity of the construction and how the long leverage provided throws the bulk of the weight on the wheel.

The farm of Mr. E. A. Hudson, Kaipara Flats, is situated at an appreciable distance from the cream stand, but fortunately the "loaded" trip is all down hill. Taking full advantage of this, Mr. Hudson has devised an outfit specially designed to take practically the whole weight of the cream can, and, with gravity providing the motive power, the cream delivery even with a full load involves no more effort than walking.

As will be seen from the illustration, simplicity of construction is combined with cheapness, the two main essentials being simply a wheel—and an idea.

Mr. M. McLean, of Kaukapakapa, like Mr. Hudson, is some distance from the road. Here again, the essentials for a cream barrow were equally simple. As shown in the illustration, the chassis is constructed from two lengths of 3 in. x 2 in. timber and a cut-down tar drum. The wheel from an old motor-cycle is fitted to run between two rigid metal plates designed to give a low centre of gravity, and this, combined with its ball bearings and pneumatic tyre, makes for very easy running—an important factor where the job is a daily one and the distance fairly long.

The cream barrow constructed by Mr. McLean. The construction is simple, yet the outfit is very light and strong. No legs are fitted, and the cut-down front makes for easy loading.

—P. S. SYME, Instructor in Agriculture, Warkworth.

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Orchard Notes

Final Hints on Harvesting and Spraying

IN harvesting the apple and pear crop the degree of maturity according as to whether the fruit will be placed on the market at once, held in orchard storage, or cool-stored must be considered. Fruit for immediate marketing should be allowed to remain on the trees to gain the maximum of colour but still retain a natural crispness. For orchard storage, the fruit may be harvested in a less mature condition than fruit picked for immediate marketing, but it should be well coloured, sound and free from blemish in order that the best results may be obtained when marketed later in the season.

It is preferable to use paper-lined cases for the storing of fruit, and while good ventilation is necessary for keeping purposes, anything that will tend to cause the fruit to wilt should be avoided. Covering the cases to prevent the entrance of vermin and the creation of a moist atmosphere will help materially to keep the fruit in good condition.

It will be necessary to inspect periodically fruit kept under orchard storage conditions, and any found in a wasty state should be eliminated.

Strict attention must be given to proper grading, and the elimination of all fruit not up to the respective grade. Uniformity of grades throughout the Dominion is necessary to ensure correct standardisation. Some districts do not produce as high a percentage of first-grade fruit as others, but this should not deter the fruit being graded to its proper standards. All fruit marked by stem punctures, stings and insect bites, which cause rots, or by any other defects detracting from the quality of the fruit should be discarded.

Under existing conditions it is possible that many new and inexperienced packers will be required, and, although fruit packing is not difficult, many fail through trying to gain speed before mastering the principles involved. Speed will come with practice, and no packer should try to force the pace until the essentials of a good pack are grasped. Correct sizing is one of the essentials. No good pack can be obtained without it. Incorrect sizing generally means a faulty pack, resulting in damage to the fruit and consequent loss in value, but with the sizing machines now in use, little difficulty should be experienced. Faults can usually be traced to the packers concerned. It is permissible for slightly smaller apples to be placed at the ends of the cases to prevent bruising, but otherwise the fruit should be of equal size throughout the case.

Cheek packing is the only style recommended, and packing on the angle should be avoided. The placing of the fruit in its correct position in the bottom layer is most important. This layer may be termed the foundation of the pack, and it is on this that the correctness of the pack throughout depends. By consolidating each layer as the packing proceeds, pressing down the end fruits firmly to prevent any possible bruising, a neat and attractive looking case of fruit should result.

Cover Crops

In some districts it is not too late to sow a cover crop for ploughing under during the spring. This is an especially valuable form of manuring where the soil is deficient in humus. The decaying organic matter of the cover crop provides the tree with plant food necessary for its health, and has a marked effect on the fertility of the soil. Aeration on heavy types of soil and the water-holding capacity of light soils is considerably increased, while soil bacteria is made more active. Of the legumes for a cover crop, blue lupin is recommended, sowing at the rate of from 1 to 1½ bushels per acre, with the addition of 1 to 1½ cwt. of superphosphate per acre. A green cover crop also has the advantage of preventing soil scouring in the orchard during the winter.

Spraying

During the harvesting, control of pests and diseases should not be neglected; otherwise disaster may be experienced with some of the later varieties of apples, especially those subject to late infections of black spot. If weather conditions are favourable for the development of fungus diseases, sprayings must be continued throughout the month and possibly well into March or April, using lime sulphur or Bordeaux mixture as recommended in previous notes. Leaf-roller caterpillar may still be causing considerable damage, and a late brood of codlin

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Many soils of high-rainfall parts of New Zealand lack Lime, and contain large quantities of Iron and Allumina, which rob the farmer of about four-fifths of every ton of Water-Soluble Phosphates spread on these soils; a Basic Slag contains, among other minerals, large quantities of a non-acid chemical compound known as Calcium-Silico-Phosphate which, it is claimed, has the power of unlocking these dormant minerals from the soil. The phosphates of a Basic Slag cannot be locked up by these soils because they are already combined in a form easily digested by the root acids as they need them.

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moth is still capable of lowering an Extra Fancy grade of fruit down to Commercial grade or even to the reject box. Sprays of lead arsenate should therefore not be abandoned until within a short period of picking.

The apple leaf-hopper can also cause considerable damage to the foliage and thereby affect fruit during the latter part of the season, while the deposits of the hopper on the fruit make it very unattractive and of lower value. It should be the aim to destroy as much red mite as possible before the winter egg laying begins. By doing this the vitality of the tree will not be impaired, and it will be much less difficult to cope with this pest the following season.

Budding

Attention should be given to grafts inserted during the spring. If any have failed to "take," there is still time to insert buds on any young growths from the older wood. Budding is usually a means of reworking trees which do not freely respond to grafting, and is mainly confined to stone fruits, although pip fruits respond quite freely. The operation consists of selecting a well-developed bud from the current season's growth and inserting it in a T-shaped incision made in any young or new growth forced from older wood and securely binding with raffia. It is better to use only wood buds taken from the middle of the shoot rather than those near the top or bottom. With peaches, treble buds should be used, the centre one being a wood bud from which the new shoot will arise.

Buds should be examined about a month after being inserted and, if necessary, the binding should be cut through with a sharp knife to prevent the strangulation of the inserted bud. They may then be left until the winter pruning, when the top is removed, forcing all the growth into the newly-inserted bud.

—G. STRATFORD, District Supervisor, Dunedin.

Citrus Notes

Cover Crops in the Orchard

CITRUS soils can be analysed either chemically or mechanically. By the former process the organic matter percentage can be determined; by the latter the clay fraction. On these two important determinations depends the water-holding capacity of a soil. Together, they form what is known as the clay-humus complex on which soil structure depends. By a mechanical analysis, the soil particles are sieved according to size into their various fractions—coarse sand, fine sand, silt and clay. A good citrus soil would have approximately 30 per cent. coarse sand, 30 per cent. fine sand, 20 per cent. silt and 20 per cent clay. A point to note is that the clay fraction may be of two different types—the silica type, normally known, which is sticky when wet and bakes hard when dry plastic and cohesive; and the sesquioxide type, which is rich in the oxides of iron and aluminium, which tends to be friable and non-plastic. The silica clay fraction is of greatest value for retaining soil moisture by forming with humus the clay-humus complex which is so important to a good citrus soil.

A cover crop of blue lupins 3 feet high just before flowering.

A cover crop of oats.

Plant residues in a citrus orchard are subject to two processes—oxidation and humification. Oxidation is destructive and occurs rapidly in the summer months when clean cultivation is practised. With adequate moisture, warmth and oxygen, it is remarkable how quickly organic matter can disappear. It is useless, therefore, to sow cover crops in a citrus orchard in order to build up the humus content of the soil and then by excessive cultivation during the summer months to destroy such organic matter as soon as it is available.

Humification, or the formation of humus, occurs through the slow decomposition of the organic matter through restricted oxygen supply such as occurs in the process of mulching. In nature, if the soil is poor in lime an acid heath or coniferous forest peat may be formed. Similarly, in the orchard, humus can exert its maximum effect on the physical condition of the

soil only when adequate lime is present and mild humus is formed. This promotes the development of a desirable crumb structure; it corrects the over-looseness and instability of sandy soils, and makes heavy clay soils more friable.

If, then, water is such an important factor in citrus production and humus is a key to water conservation, all practices of orchard soil management should be viewed from this aspect. The first thing to do this month is to mulch citrus trees with existing weed growth if no cover crop was sown previously. Weeds should not be burnt unless they are infected with some disease which can be spread to the trees.

The practices of hoeing and discing, mowing, etc., are carried out to aerate the soil and reduce the foliage surface of transpiring leaves. It was formerly thought that water could be drawn up from a deep water table by capillary action in the same way that oil rises in a lamp wick. It is now known that this applies only where the water table is within six feet of the surface, and as this is not the case in citrus orchards, hoeing does not greatly check the loss of water from the soil, but by checking weed growth it reduces the loss through transpiration. With the present labour shortage, scything or mowing the weeds would probably be equally effective and conserve considerable energy spent in hoeing. On heavier soils, frequent cultivation may be necessary to provide adequate aeration at present, but it could be reduced in future years if the soil structure were improved by humus. A seed bed for such cover crop should be prepared now and one of the following suggested mixtures ordered for March sowing:—

Blue lupins: 1½ lb.
Oats: 1½ lb.
Mustard: 20 lb.
} per acre.

Red clover: 6 lb.
Italian rye: 12 lb.
} per acre.

Lotus major: 3 lb.
Italian rye: 15 lb.
} per acre.

Lotus angustissimus: 3 lb.
Italian rye: 15 lb.
} per acre.

Red clover or cow grass sown at 9 lb. per acre with superphosphate in each case at 4 cwt. per acre, plus lime 10 cwt. per acre, are suitable on sesquioxide clay soils.

—*A. M. W. GREIG, Citriculturist, Auckland.*

Reminders for the Month.

Conserve soil moisture.
Mulch your citrus trees.
Prepare soil for cover crops.
Order seed and manures for cover crops.
Order autumn manure requirements.
Apply 3 per cent. certified summer oil to all citrus trees.

Cool Storage Notes

Selection of Fruit for Long Storage

STOCKS of apples and pears intended to supply the market requirements from August until the end of the season should be carefully selected for long-period storage. The fruit should be preferably medium-sized Extra Fancy and Fancy grades, and should be free from blemishes, which may develop into rots. The keeping qualities of apples or pears cannot be determined by external appearance only, but the crop per tree and the history of the keeping quality of the fruit from each orchard during past seasons should be a guide.

Pears

Winter Nelis, Winter Cole and P. Barry pears should be harvested when mature and in a green and firm condition. They should be placed immediately into cool storage, and rapidly reduced in temperature to 30° F. This treatment is essential to check the maturing process and to ensure that all the pears can be maintained at the same maturity. A mixed maturity will encourage rot development, hasten release of the fruit on glutted markets, and bring about wastage and financial loss.

A method of stacking pears in cool storage chambers to provide air spaces around the boxes will ensure rapid cooling and will assist in preventing fluctuating temperatures. Sufficient moisture should be maintained in the storage atmosphere to minimise wilting of the fruit. A relative humidity of 90 per cent. is beneficial for pear storage.

Apples

Long storage stocks of varieties of apples such as Delicious, Granny Smith, Tasma and Dougherty should be specially selected for appearance and keeping quality. These varieties should be held at 32° F. flesh temperature, and a relative humidity of 90 per cent. should be maintained in the storage atmosphere. Delicious should be well-coloured, Extra Fancy and Fancy grades and sizes of 138 to 163, and placed in cool storage in a firm condition before March 22.

To meet the position arising out of the short supply of oil wraps for fruit to be held in storage, it is recommended:—

(1) That Granny Smith apples grown in Auckland and Nelson districts should be picked between April 10 and 15, and in Hawke's Bay between April 15 and 20;

(2) That fruit be held, preferably loose in cases, in a cool dry position in orchard for period of ten days before storing;

(3) That, when placed in cool storage, the flesh temperature of the fruit be reduced to 32 deg. Fah.

When intended for long storage it is important that only fruit of a fresh, green colour should be placed in cool storage.

Tasma and Dougherty should be placed in cool storage before April 30.

Sturmers to supply the markets near the end of the season should be carefully selected for keeping quality in Extra Fancy and Fancy grades, sizes 138 and smaller. They should be picked and placed in cool storage between April 14 and 24, and held at a flesh temperature of 37° F. Sturmers are very susceptible to flesh collapse if their flesh temperature is reduced lower than 37° F. A relative humidity of 90 per cent. in the storage atmosphere will prevent wilting.

The best results with the long storage of apples and pears are obtainable by a careful selection of the fruit and by placing it in cool storage in the producing districts. By segregating growers' registered numbers to separate stacks in storage, a regular inspection will be facilitated of each line of fruit throughout the storage period until it is released for marketing.

—*A. A. POWELL, Cool Storage Officer, Wellington.*

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Guide for the Home Garden

Autumn Sowing and Care of Plants

TOMATO plants which have been well grown should now be supplying the family requirements of tomatoes, and, with proper attention, will continue to do so for some considerable time. Warm days, cool nights with heavy dews, followed by occasional periods of high humidity, make it imperative that spraying the plants with Bordeaux mixture should be attended to if the profitable life of the plants is to be prolonged.

Home gardeners would do well to note that commercial plantings of tomatoes have not increased this season, and, although there may be a short period of plentiful supplies available in the auction markets, prices can reasonably be expected to be above normal. For those who value home-produced tomatoes, there should not be any doubt as to the necessity for maintaining their plants in the best possible condition.

When In Trouble

When results from sowing your own seeds and growing your own plants are unsatisfactory and you are worrying over the probable cause, why not consign your troubles to the Director of the Horticulture Division, P.O. Box 3004, Wellington? He may be able to assist you. Write him now.

The suggestions made in the January issue of the "Journal" concerning liquid manuring should be adopted, and all surplus growths removed from the plants. Hoeing—always shallow—for weed destruction and to assist in the conservation of soil moisture must not be neglected.

Seeds to Sow In March

Sowings may still be made of lettuce, silver beet, spinach, and, in warm districts, carrots. Plants of the first two vegetables may be sown in a seedling box, but, when transplanted, all the plants should be grown on raised beds. This will afford the necessary drainage for excessive rain. It cannot be too strongly emphasised that vegetable plants will not give best results in badly-drained soil.

Lettuce may be planted in rows 12 inches apart, and for a winter crop, 10 inches will be sufficient space between the plants. The rows of silver beet should be 15 inches wide and the plants spaced 10 inches apart.

Seed of spinach may be sown in rows 12 inches apart, and a distance of 10 inches allowed between rows of carrots.

Varieties recommended are:—

Lettuce.—Neapolitan (winter special), Wonderful (winter special).

Silver Beet.—Broad White Ribbed.

Spinach.—Prickly (winter); Round (summer).

Carrots.—Earlykrop, Early Shorthorn).

The carrot bed will, of necessity, not occcupy the same part of the garden as that in which the previous crop of this vegetable was grown. Two-year rotation is good, but a three-year rotation is better. Provided the carrot seed is sown on the land previously occupied by potatoes, sufficient plant nutrient residues should be still remaining in the soil to satisfy the fertiliser requirements of the carrot bed. Blood and bone manure is suitable for lettuce and silver beet, but, should this not be available, poultry or sheep manure will be quite satisfactory substitutes. These, however, must be applied in a perfectly dry condition, preferably after the garden is dug, and then thoroughly incorporated with the soil.

Spinach must be well and quickly grown to be obtained in its best and most succulent condition, and, to achieve this, the use of quick-acting fertilisers is necessary. If available, mix 2 parts superphosphate and 1 part sulphate of ammonia—both measured by weight—and, as soon as the plants attain a height of 1 to 2 inches, apply at the rate of 1 lb. to 30 feet of row.

Care must be taken to ensure that none of the fertiliser comes in contact with the foliage of the plants. Should this occur, much damage will result and the immediate growth of the plants seriously impeded. The fertiliser must be immediately worked into the soil, and subsequent weekly dressings of liquid manure must be applied to assist quick development of the crop (see January issue of the "Journal" for remarks on liquid manure).

Seasonal Don'ts

Don't

put off till tomorrow what can be done today. Procrastination is the thief of time.

Don't

neglect spraying or dusting Flower of Spring cabbage seedlings with an insecticide. This is the most highly prized and valuable early spring green vegetable.

Don't

omit to lay the foundation of the compost heap in March.

Don't

delay early preparation of your onion bed. Onion seed should be sown in the South Island in early March; late March or early April in the North Island.

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What to Do in the Home Garden Next Month

Summary of Operations During March

VEGETABLE SECTION.

SUCCESSIONAL SOWINGS.

Peas (dwarf late Feb.); lettuce; radish (long scarlet).

OTHER SOWINGS.

Carrots (Earlykrop, Scarlet Horn); turnips (Snowball, Model White); endive (green curled); onions (Pukekohe Longkeeper); spinach (Prickly—long-standing); swede (Superlative, Success).

Asparagus.—Destroy all top growth as soon as ripe. Rhubarb.—Cut out seed stalks close to base. If available, spread a mulch of stable manure.

CROPS IN SEASON.

(The month in brackets represents the month of sowing the seed.)

Lettuce (May, late spring cutting); radish (almost all the year round); sweet corn (late spring and summer); tomatoes, outside-grown (early, mid Aug.; late, early Oct.); celery (early Sept.); cucumbers (Sept.); spring onions (Mar.); capsicum (Aug.); egg plant (Oct.).

OTHER CROPS.

Beans, marrows and pumpkins (late Oct. and Nov.); spinach (almost any month); roots (Feb.-Mar.); carrots and parsnips (Sept.-Oct. maincrop).

GLASSHOUSE SECTION.

Every glasshouse tomato-grower must determine, according to his own requirements, at what stage of maturity his green manure crop may be dug into the soil. Light soils will be better improved if the green material is permitted to grow as long as possible in the green condition. There will be a greater volume of plant growth to dig in which will increase the organic content of the soil, thereby providing the medium of greater water-retaining capacity. If it is desired to produce resistant fibrous material which will better loosen the soil, the green crop should be allowed to grow as near to complete maturity as is consistent with the necessary preliminary preparations for the next succeding crop.

Beans and Peas

To obtain the maximum crop from beans and peas it is necessary that the pods should be kept closely picked and that none are allowed to ripen until it is decided to retain sufficient from which seed may be saved for sowing next season.

Picking the beans when they are young will prolong the profitable bearing life of the vine, and, should their use at the time of harvesting be inconvenient, they can be very easily preserved for winter use.

Cabbage, Cauliflower And Broccoli

Given favourable weather conditions, the caterpillars of the white butterfly will for the next two months be very active in destructive work, particularly among members of the cabbage family. Nicotine sulphate, arsenate of lead and derris, either as a dust or spray, will prove effective destroying agents. When the spraying or dusting of plants is being carried out, it is important that the centre of all plants receives full treatment. If this is not attended to, the caterpillars will destroy the principal growing part of the vegetable. Weekly applications of liquid manure will materially assist in maintaining vigorous and healthy growth.

Harvesting Onions

Unless there is prolonged wet weather when onions are due, or almost due, to be harvested, bending the tops in order to induce ripening is not recommended. If it is at all possible, the onions should be permitted to ripen naturally and then pulled out of the soil. This is easily done, as the roots have almost lost their grip. Should the soil be damp when the onions are removed, place them on a verandah, preferably with a northern or north-westerly aspect. Left here for a few days, they will ripen firmly, after which, if it is intended to store them, the tops and roots may be removed. Provided the tops are not disturbed, they may be twined round a piece of heavy binder twine and "locked" by the weight of the bulb. This operation completed, the onions should be hung in a shed or outhouse, where they will not be liable to become moist with rain, and where there is good air circulation. Treated in this manner, the best keeping strains of Pukekohe Longkeeper onions will remain in good condition until the following October or November, and even longer.

—*D. K. PRITCHARD, Instructor in Vegetable Culture, Wellington.*

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Seasonal Work for Beekeepers

Possibilities of Package Bees in New Zealand

BECAUSE of their geographical situation, beekeepers in Otago and Southland experience a much later spring than beekeepers in the North Island, particularly in North Auckland, where the season is fully six weeks earlier. Consequently, the possibility of rearing young queens and bees in the north and sending them to the south for early work there has been discussed by beekeepers for many years.

The idea has been that the supplier would forward the bees with a young Italian laying queen early in the spring to the railway station nearest to the buyer, who would take over the combless packages and transfer the bees to combs and give them sugar syrup and other necessary attention with the view to producing a crop of honey. The necessary beeware would need to be on hand from the previous autumn, when the normal requirements of honey for wintering bees would have been extracted and the bees destroyed.

On a few occasions during the last nine years, one or two packages have been despatched from Auckland to interested beekeepers in the south, but, chiefly because of the small consignments, the results were not sufficiently conclusive for the beekeepers to decide on any definite line of action. The packages, however, served a very good purpose in creating general interest, and some southern progressive producers sought further trials on a more comprehensive scale.

Experimental Shipments

As a result, the Government, through the Department of Agriculture, initiated experimental shipments of combless package bees from northern districts to Southland and Otago to determine the economic value of this procedure as against the maintenance of colonies over a long unproductive winter period. The co-operation of various beekeepers was obtained, and trial shipments were made to enable them to sum up the prospects of this phase of beekeeping and ultimately to act on their own initiative should circumstances warrant consideration.

To ensure that the bees would arrive at their destination in good order after traversing the longest distance package bees have yet travelled in New Zealand, a number of important factors required attention.

A suitable package was designed. Provision for holding candy was made by means of two pockets on the lid, and an allowance was made for the insertion of a queen cage to be detachable without opening the package.

REMINDERS FOR THE MONTH.

Do not remove honey from the hives until it is capped over by the bees.

The removal of honey should be carried out during dry weather.

Avoid the storage of full extracting combs for any length of time during wet weather.

Keep all honey house utensils as clean and sterile as possible.

Renew all cracked rubber tubes used in connection with steam-heated uncapping knives.

Thoroughly clarify all honey before packing.

Do not allow air bubbles to be incorporated in the honey, as they invariably carry contamination, which later becomes apparent in stored honey.

Keep all tanks containing honey well covered to prevent the absorption of moisture.

—T. S. WINTER, Senior Apiary Instructor, Wellington.

Consideration was given to keeping the cluster of bees intact, to the travelling comforts of the queen, to ventilation and to the general welfare of the bees. Investigations regarding transport revealed that boat delivery from Whangarei to Dunedin would take approximately nine days, and while this method would be considerably cheaper than by rail, the time factor made it unreasonable.

In due time, queen-rearing was undertaken, and young Italian queens for the job were laying at the beginning of October for delivery on or about October 15. It was arranged to supply twenty 3 lb. combless packages of bees with queens at 15/- each.

Dispatch of Bees

Although adverse weather conditions slightly delayed operations, the work was carried out in good time. Correct weight was considered essential, but some allowance for at least ordinary death rate and the honey held by the bees was thought necessary, perhaps important, from an experimental point of view. Therefore, each package was given 2 oz. to 3 oz. extra weight in bees. The queens were caged separately without candy, and the cages were placed in position for the bees to care for the queens. Each package was supplied with 6½ oz. of candy and securely fastened.

As the journey was likely to be a severe test on the bees in view of the distance and the different modes of conveyance, the packages of bees were held overnight to connect with suitable train arrangements. Everything was carried out according to schedule, and the package bees were despatched by rail from Whangarei to Ranfurly, North Balclutha and Gore on October 15. They arrived at their destination three days later, but some bees were not transferred until the fourth day after despatch, and this made a total confinement of five days. Advice was received that the condition of the bees was excellent, only a normal death rate having occurred. Before despatch, a package of bees was put through a severe test of confinement for five days to ascertain their condition in view of the journey that was ahead of the packages under review. The bees of this package were possibly more distressed than those of the twenty packages.

Costs of Supply

The fact that the experiment to this stage had been successful was a side issue if the costs of supply were likely to offset the development of this phase of beekeeping. An endeavour, therefore, has been made to assess the cost, which, in reality, is an estimate, because it would be subject to variation from a beekeeper's point of view, and the volume of turnover should inversely influence the price. The return of the empty packages was investigated, but this was found to be impracticable, because the average freight charges on actual figures were a fraction more than 1/7, to which depreciation would need to be added, as compared with an assessed value of 1/3 for the package complete with the queen cage. The cost of freight on the packages of bees averaged 2/6, which is a considerable item of the cost of supply.

The price of the bees amounts to a business risk in view of the variations in the seasons and a loss of honey

(Continued on page 141.)

The Theory and Practice of Feeding

OF all the varied operations on a poultry farm, feeding is of the greatest importance. It is essentially a practical operation, but feeding without some knowledge of the theory upon which the practice is based is fundamentally unsound. Adjustments and alterations in rations according to season and circumstances cannot be made with confidence unless the poultrykeeper has a reasonable idea of how his stock will react to such changes. There is insufficient margin of profit in poultrykeeping today to allow poultrymen to work on a "hit or miss" plan of feeding. To scoff at the necessity for having a working knowledge of the scientific principles of feeding is not only short-sighted, but may also result in a loss of money at any time.

It is proposed to describe in this and subsequent articles the theory and practice of poultry feeding. An effort will be made to avoid the use of technical terms except in cases of necessity, while the information given will be the minimum that any poultrykeeper should have if wholly dependent upon poultry for his living. A moment's thought will satisfy any thinking poultryman that it is not sufficient to have just a knowledge of the foodstuffs in use for poultry. Some knowledge of the bird with which he is working is surely essential. For this reason, the subject of feeding now to be discussed will be divided into three parts:—

Part 1: How a Bird makes use of its Food.

Part 2: The Principles of Feeding.

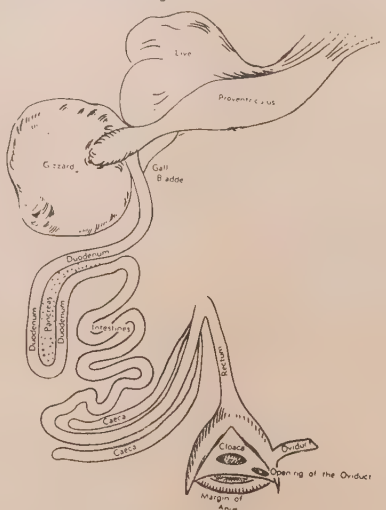
Part 3: Practical Methods of Feeding and Rations.

It will be impossible within the limited scope of these articles to deal with each part in complete detail. For such extensive information recourse must be made to one of the standard books on poultry husbandry.

PART I.

How a Bird Makes Use of Its Food

To understand how a bird makes use of its food it will be necessary to examine the construction of its digestive system, by which the raw material in the form of ordinary foodstuffs is gradually broken down and taken into the system for maintenance and production. The simplest method of obtaining this knowledge is to trace the course of food from the point of entering the beak until the final evacuation of waste material through the vent of the bird.



The Digestive System of the Fowl.

The Mouth And Gullet

As in the instance of humans, food on entering the mouth meets with saliva which aids the bird to swallow, but since no teeth are present, there is a complete absence of all grinding in the mouth. From the mouth, food is rapidly forced down the gullet into the crop, a pouch-like expansion of the gullet. The crop is a storage place for coarse food immediately after being swallowed, and it is here that the food is softened by the juices and water passing down from the mouth and gullet. The moistened food now ferments in the crop and is thereby rendered more digestible (that is, predigestion takes place). In passing, it may be noted that, if for any reason, such as a stoppage beyond the crop, the food is unable to pass on down the digestive system, it continues to ferment in the crop, gases are formed, and the result is what the poultrykeeper knows as "sour crop."

The Stomach

From the crop the softened food passes to a small stomach (Proventriculus) through which it passes fairly rapidly. While here, however, it meets digestive juices and the first real digestion or breaking down of the food takes place.

The Gizzard

The next stage is an important one. The partially digested food now moves into the gizzard, upon the satisfactory working of which depends the healthy condition of the digestive system. It will be necessary to examine the gizzard more closely if its functions are to be clearly understood. Most poultrykeepers know that the gizzard is a hard, reddish, oval-shaped organ. It is composed of an outer covering of very powerful muscles, while the inner lining is tough or leathery and raised into ridges. When healthy, these powerful muscles contract and expand continuously, and in so doing grind or crush the food inside.

It is natural for birds to eat hard grit, which collects in the gizzard, and this grit, in turn, adds to the efficiency of the grinding power of the organ. Starve birds of hard grit—easily done where birds are kept intensively—and the efficiency of the gizzard in grinding food is reduced appreciably. A lack of grit and hard food (dry grain) passing through the gizzard results in the muscles becoming flabby and weak. When this has occurred, such hard and fibrous food as the bird does receive is not ground up satisfactorily, and is forced to pass on to the next stage in an "undigested" form. Dangers associated with this will be discussed later.

Intestines

The next portion of the digestive system comprises the intestines—the long tube-like organ filling the body cavity. The several portions of the intestines have special technical names, but for the poultrykeeper only one is of importance, namely, the duodenum, which forms the first big loop of the intestine immediately following the gizzard. This is the portion of the intestine principally attacked by the

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organisms of a disease affecting poultry known as duodenal coccidiosis.

Food passing from the gizzard and now well ground up into a fine condition is further acted upon by digestive juices until the digestion or breaking-down of the food is completed. The intestines have a further all-important function. So far, on its journey from the mouth, food has been softened and fermented (crop), mixed with digested juices (stomach or proventriculus), ground up (gizzard), and again well mixed with digestive juices (intestines), but no mention has yet been made of how this digested food is taken into the rest of the bird's system. It is in the intestines, which offer a long surface throughout their length, that the final food products are taken into the bird by way of the blood. This is termed the assimilation of the food. Innumerable small blood vessels are situated in the extremely delicate lining of the intestines, and these assimilate the food constituents which have now been prepared by the entire digestive system. Any material which is unsuitable for absorption in this way is passed out through the vent in the droppings.

This description would be incomplete without a brief reference to the "blind guts" or caeca, two tube-like attachments found joined to the latter end of the intestines at some little distance from the vent. Little is known as to their functions in the digestive system, and the name is only familiar to poultrykeepers in connection with "caecal coccidiosis," a disease of young growing chickens.

At this stage it may be difficult for the practical poultrykeeper to see why a knowledge of the digestive system of a fowl is of value to him. Part 2 will indicate how incorrect feeding may cause a breakdown in health and how food may be wasted. It has already been pointed out that hard grit is essential for the healthy functioning of the gizzard. Should this organ fail to grind the hard and fibrous foods satisfactorily, digestive troubles are likely to follow. Again, it will not be out of place to emphasise the importance of the delicate lining of the intestines where all the final food products are absorbed into the blood system for distribution to all parts of the body. Should this delicate lining be destroyed by internal parasites, such as round worms, by the numerous minute organisms causing coccidiosis, or by food improperly ground in the gizzard, then it is obvious that the bird will be unable to absorb the food it has digested. Hence, birds suffering from worm infestations or coccidiosis become thin, as though starved, in spite of the fact that they eat plenty of food. Thus, any form of incorrect feeding which injures this all-important lining to the intestines will reflect back immediately upon the health and efficiency of a laying bird.

Digestive Juices

Reference has been made to digestive juices, the function of which is to break down all food passing through the digestive sytem until it is in a form suitable for absorption into the blood system via the lining of the intestines. It is of interest to note where these juices are prepared, as they are of so much importance. In the first place, a proportion of the digestive juices are secreted from special glands in the stomach (proventriculus) and intestines. Additional supplies are poured into the duodenum from two important organs known as the pancreas and liver. The position of the pancreas—within the first loop of the intestines—may be observed in the diagram supplied. Poultrykeepers are all familiar with the appearance and position of the liver. The juices supplied by these two organs are essential for satisfactory digestion, and should anything render either organs unhealthy, then the digestive system and the bird suffer accordingly.

Part 2 in next month's issue will give a description of the essential food constituents required by poultry.

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Federation of Young Farmers' Clubs

Message from President of National Federation Of Y.F.C. in Great Britain

THE following letter has been received from His Grace the Duke of Norfolk, President of the National Federation of Young Farmers' Clubs in Great Britain, addressed to the Dominion President of the New Zealand Federation of Y.F.C.:—

"I have just had the opportunity of reading the address delivered by you at the seventh annual meeting of the New Zealand Federation of Young Farmers' Clubs.

"I remember well the formation of your Federation, because it was just about the time when I became President of our Federation over here.

"I can appreciate the difficulties under which you are working on your side, because, as you so truly remark in your address, like you, we also are not without our troubles.

"We are greatly stirred to know that more than 2000 of your members have already left the Dominion to 'do their bit' overseas with the fighting forces. That fact, and the allusion you were kind enough to make to us, will move us to redoubled efforts.

"We have not forgotten the wonderful hospitality accorded by New Zealand to the party of our young members a few years ago, and in sending our greetings to you, we look forward to the renewal of those associations, when side by side with you we have achieved victory."

Yours truly,
(Sgd.) Norfolk.

Lincoln College Scholarship Awarded

FOR a number of years past, the Canterbury Agricultural College Old Students' Association has made available a scholarship valued at twenty-five guineas to a South Island member of the Young Farmers' Club Movement.

This offer has been repeated again, and the chairman of the committee appointed to select the scholarship-holder, Mr. A. C. Cameron, has pleasure in announcing that Angus Walter McKay, of Methven, has received the honour for 1942. He will begin his studies at Lincoln College immediately.

McKay was selected from a number of applicants, all of whose applications required serious consideration. He is a son of Mr. A. J. McKay, of "Three Springs," Methven, who himself is recognised as one of the most enterprising farmers in the district.

From results achieved during the last few seasons in the production of certified seeds and crops on "Three Springs," this year's scholarship-holder should be splendidly equipped to take an intelligent part in the practical side of his studies at Lincoln College. He has just completed his fourth year at Methven District High School, having passed his Public Service Entrance Examination in 1940, and is at present awaiting results of the Matriculation Examination he sat at the end of 1941. His sporting activities while at school included captain of first fifteen as well as cricket, swimming and athletics.

McKay has been a member of the Methven Club for a number of years, and is also a member of the Methven Pig Club and the District Home Guard.

The Selection Committee extends to McKay its congratulations, and wishes him every success during his studies at Lincoln College.

Plantations for Farm Shelter

Compiled by the Cardiff Young Farmers' Club.

(*Continued from the November issue.*)

For Quick Shelter

For a quick shelter up to 8 ft. high, pampas grass is unsurpassed for Central Taranaki. It may also be used on the leeward side of a windbreak, and has the advantage of being a good stock food, which may be used in periods of short supply of supplementary feed. It recovers rapidly, and, after being fed off during the winter, will make sufficient growth to again give shelter in the following winter. It should be planted in the winter in rows 6 ft. apart, with 6 ft. between plants, with the protective fence at least 4 ft. from the plants. Two-year-old plants are preferable, but root cuttings may also be used. A handful of super and blood and bone worked into the soil around the roots gives the pampas a better start.

Before planting trees, the area should be ploughed and cultivated, as this makes for easy cleaning during the first few years while the trees are small. Although plantations have been successfully established by planting in small holes or behind the spade, this method is unsuitable for most varieties. Prepare a round hole with a diameter of at least 3 ft., leaving the bottom shaped like an inverted saucer. Place the tree in the centre of the hole in an upright position, but in very exposed positions place the tree against the solid earth on the side of the hole away from the prevailing wind. Spread the roots out and gently work some loose soil around them; then firm well by tramping. Care should be taken not to plant deeper than the tree was

originally growing. Most failures are due to allowing the roots to become partially dry and putting grassy sods into the hole, which allow air spaces to form, with a consequent drying of the roots.

Time to Plant

The time of the year to plant varies with the climatic conditions, and may be from April in the north to October in the more elevated colder districts. June and July are suited only to the hardier conifers. In Central Taranaki the best results are obtained by planting in September, although successful plantings have been made in May. It is better to postpone operations until late in the season than to plant in wet or waterlogged soils. The best results are obtained when the holes are prepared in the autumn, then any excess of water at planting time is usually noticed in the holes.

In small plantations, a garden line may be used to keep the trees in line, but on bigger undertakings, where the land is usually covered with fern or scrub, two sighting sticks arranged as for striking out when ploughing, are quite satisfactory. Most young trees are adapted to growing on the forest floor, so that a small amount of shade is to their advantage, but tall gorse, manuka, etc., should be cut with a slasher and left on the ground to give a little shelter.

The majority of shelter trees are too deeply rooted to benefit much from topdressing, and in large plantations it would not be practicable to carry manure over the unbroken country usually devoted to plantations of this type. In small undertakings, however, good results are obtained by putting a small amount of well-rotted farmyard manure under each tree. If artificial manures are used a good handful of a mixture of equal parts of super and blood and bone mixed with the soil in the hole, gives good results.

Raising Trees From Seed

Although most farmers prefer to buy the plants when needed, practically all the varieties of shelter trees are easily raised from seed. Sow the seed in shallow drills in seed boxes, cover with hessian or scrim, and place in a shady position. Generally speaking, sow the seed during the same month that experience has proved to be the best for transplanting. When the seedlings are large enough to handle, transplant them in a nursery, allowing 4 in. between the plants and 12 in. between the rows. It is necessary to keep this area free from weeds so that the trees receive plenty of sunshine. If allowed to be overshadowed by weeds in the early stages of growth, they are likely to grow tall and thin and be somewhat delicate. Most varieties require to be two or three years old before being moved to their permanent position.

In the autumn before planting out, wrench all trees to be shifted by cutting the taproot with a clean, sharp

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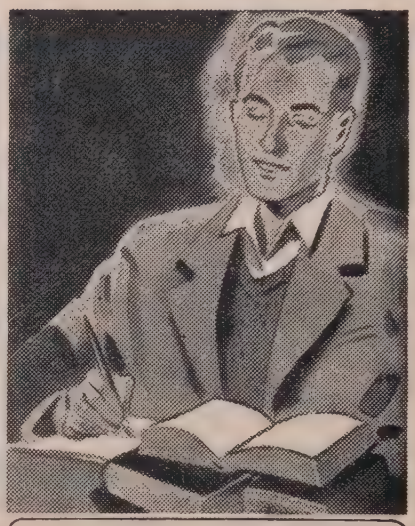

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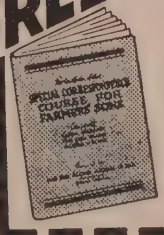

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spade and gently raising the tree slightly. This causes a fresh growth of fibrous roots near the surface of the ground, and these roots supply the tree with food after shifting. The lack of wrenching is the main cause of failure when native trees are moved from the bush to a cultivated area, such as a shrubbery.

Boxthorn, barberry, eleagnus, and escallonia may be grown from cuttings. Successful hedges have been established by placing the cuttings in their permanent positions, provided the ground has been well prepared, but if a few cuttings fail to strike, a ragged hedge results. Better results are obtained by striking the cuttings in a nursery and transplanting when large enough.

Cost

The cost of hedges and windbreaks varies considerably with the type and age of the plants selected. In some cases, also, extra fences have to be provided, and at present prices this costs approximately 30s per chain. Most varieties of trees can be purchased for from 30s to £2 per hundred, and as these are mainly planted about 6 ft. apart, the cost per chain for a single row works out at 4s. for trees alone. To this figure must be added the cost of planting and maintenance during the first few years of growth. When grown from seed, the cost is small, labour charges being the only large expense.

Where plantations are established on rough country, it pays to clear a patch around each tree corresponding to the size of the hole in which the tree was originally planted. The more often this is done the better the result, but three times at intervals of a year should be the minimum. Blanking—that is, replacing dead trees—should be done for the first two years. Any trees which have formed a hole at ground level through swaying should be properly firmed. After several years, some thinning is usually necessary and desirable. Remove all badly shaped trees and also those which are not doing well. Hedges and small areas should receive hand cultivation until well established, while those larger areas on cultivated ground respond to horse-hoeing and cultivation for two or three years.

Suitable Positions

Consideration must be given to the positions selected for windbreaks and hedges, as these are permanent fixtures, and cannot be moved except in the first year or two. This applies particularly when they are near a dwelling or building. If large-growing trees are planted too close to a dwelling, both it and the garden become overshadowed. The far-reaching roots deplete the fertility of the garden soil, while the shade makes the house damp and unhealthy. Large trees should not be planted closer than two chains from the house and on the windward side only, and in front of this and at least 15 ft. nearer the house a small hedge of escallonia, barberry, or eleagnus should be planted to prevent the draughts that will be created when the trees reach maturity.

Where there are large open drains the planting of a fibrous-rooted hedge alongside it tends to hold the banks, while the shade created prevents the sun and wind from crumbling the banks. Growth in the drain is also discouraged, and this makes for easier cleaning, while the drain is not gradually growing wider, as is the case in exposed areas. In Central Taranaki, where most of the farms are dissected by deep depressions or creeks originating on Mount Egmont, sufficient shade and shelter can usually be obtained by planting the sloping sides of these creeks with pines. Even though this species opens up at ground level, a good wind-proof break is formed, as the bare part of the trees is below the surrounding country by virtue of being planted near the creek edge. Pines planted in this position do well, as they are well sheltered for a few years and yet receive plenty of sunlight. Such plantations utilise waste ground, prevent loss of stock in the creek, and act as a perfect control against weed growth in odd corners, thus saving much useless labour.

As previously stated, Lawsoniana requires fencing from stock, but several instances are available in the Taranaki district where no harm has come to this variety without fencing provided it is planted on a creek bank or in some similar position where stock are unable to obtain a comfortable foothold while rubbing the tree. On the same farms this species has also been propagated from cuttings, but the poor results obtained condemn this method.

Fencing Material

Hardwood timbers naturally make the best fencing material, but because of their slow growth, are not usually planted except for ornamental purposes. The useful life of softwood timbers can be greatly increased by the use of creosote. Pinus insignis posts, treated with creosote, have lasted more than 20 years, and correspondingly longer life can be expected from better varieties. Battens treated with creosote do not split so readily, and thus retain the staples longer, with a consequent lowering of maintenance costs.

To give the desired effect, creosote must be forced into the timber to as great a depth as possible. In commercial undertakings this is done under pressure. On the farm, good results can be obtained by the following method. Lower the posts or battens into a bath of boiling creosote, leave for several minutes, remove to a bath of cold creosote for half an hour, and then place on a rack to dry so that the surplus creosote gravitates back into the bath.

When the timber is placed in the hot creosote, any sap or moisture is driven off by the heat and a vacuum is created. This is filled with creosote when the timber is placed in the cold bath. The quantity of creosote required varies considerably with the size, age, and variety of posts, but with sawn rimu battens, 2 in. square, 40 gallons will treat 2,000 of them. For lighter timber, such as gates, sheep yards, etc., good results can be obtained by painting with a mixture of equal parts of creosote and tar. This should be done before the timber is used, so that all joints are treated, as it is here that decay first appears. The application of a second coat of the same mixture about a month later, when the timber has been erected, will give a shiny black surface, absolutely impervious to water. It will be found that the first coat is absorbed by the timber without giving that waterproof covering that is necessary for long life.

Old engine oil may also be used for preserving farm timber, including buildings, but once timber is treated with this oil, it is difficult to apply paint at a later date unless many years have elapsed.

In conclusion, we would urge all to plant as many trees as possible to replace in a small way the large number of trees sacrificed to give us our farming lands. No better insurance against erosion, a lessening rainfall, and a lowering of our primary production can be made with such a small capital outlay as by planting trees and shelter.

Wairarapa District Essay Contest

By N. LAMONT, District Y.F.C. Secretary, Masterton

ALTHOUGH it was to be expected that senior entries in the Wairarapa District Essay Contest would be fewer this year, it is nevertheless disappointing to have to record that only two entries were received from the whole district. The junior class, however, introduced for the first time this year, was more satisfactory, and seven good essays were received. The subject for the senior essays dealt with the relative attractiveness of a farming career, while the junior en-

trants were asked to give their views on how the Young Farmers' Clubs might be made more attractive to young members.

We are again indebted to Sir Wm. Perry for his services as judge, and he has made the following awards:—

Senior.—W. T. Cheetham, Mauriceville, 1; C. A. Mackay, Masterton, 2.

Junior.—R. E. Andrews, Carterton, 1; M. Renall, Carterton, 2; J. Madden, Masterton, 3.

In view of the special concern at present in attracting younger members, the opinions of the junior competitors are of interest in planning future activities. It was a noticeable feature of all the junior entries that great stress was laid on the popularity of field days, experiments and demonstrations. Many were quite frank in their condemnation of an unvarying diet of lectures, and urged the greater use of films, and the encouragement of debates, etc.

The importance of some form of transport organisation was also recognised by essayists, and there is no doubt that much could be done by clubs in this direction by arranging for members in the same locality to travel to club meetings and functions in a single car.

On the whole, the interest taken by junior members in the essay contest and the opinions they have expressed are distinctly encouraging, and it is felt that the contest is fully justified on these grounds alone.

Feilding and District Y.F.C. Stock Show

By T. H. HENSON, Hon. Sec. Feilding Y.F.C.

THE Feilding and District Y.F.C. held its first stock show recently at the Feilding Showgrounds, and, assisted by a perfect day, the fixture was an outstanding success. Excellent entries were attracted from over a wide area, and many prominent stock breeders were among the exhibitors. Strong support was in evidence throughout the catalogue, and the standard of entries was fully up to that at major fixtures. With an attendance of between 350 and 400, the show proved quite a financial success, and the committee hopes to be able to hand over a respectable sum to the Feilding A. and P. Association for patriotic purposes. Very helpful support was accorded by way of donations and trophies, nearly £50 being received in donations, and £5 worth of trophies. This support came from stock firms, breeders and from many Young Farmers themselves.

Associated with the show was the district fat lamb competition, which drew 64 entries, and the district stock judging competition, which proved very successful. The show was officially opened by Flying Officer E. W. Barnett, a past president of the Y.F.C. Federation.

Mr. A. C. Buist, Patron of the Show, expressed the thanks of the clubs to the A. and P. Association and the Jockey Club for the use of the ground, and to Miss Miller, Secretary of the Association, for the help and guidance she had given. He hoped the show would be the forerunner of others throughout the district.

Mr. Bruce McLeod, President of the A. and P. Association, congratulated the Young Farmers on their efforts, and said it was gratifying to see such success attending their first attempt. Flying Officer E. W. Barnett extended his congratulations to the Feilding Club on its enterprise. He could see, he said, that the Young Farmers of today realised the responsibility that had been handed on to them by the farmers of an older generation, and he was pleased to see that they were prepared to accept that responsibility. No doubt some of the members of the clubs felt that they would be doing greater service in some other sphere of activity, but he assured them that every extra bushel of wheat they grew, every pound of butter, cheese or pork that they produced, was something towards winning the war, and if they continued to do this task well, they would be helping to bring the war to a victorious conclusion. He then declared the show open.

There were 173 entries of purebred sheep. Romneys provided 31 in the open classes and 50 in the natural condition classes, and a perusal of the catalogue indicated the strength of the competition, entries being received from flocks of the very highest standard. Southdowns were also well represented, with 20 in the open classes and 72 in the natural condition classes. In the latter, the single two-tooth ram class drew no fewer than 15 entries.

There was a good exhibition also of dairy cattle, 67 pedigree animals being entered, of which 47 were Jerseys and 17 milking Shorthorns; these were drawn almost wholly from the vicinity, but included many high-priced animals purchased by the exhibitors.

The strength of the pig exhibits was a pleasant surprise, for there were 83 pedigree entries covering the four main breeds. There were also 29 entries in the utility pork and bacon classes.

Entries in the horse sections were satisfactory, and there was good competition in the "ladies hack," "best paced and mannered," "farm hack," best pony," and "working horses."

In all classes the judges spoke highly of the standard of the animals brought forward.

Among the Clubs: Reports on Activities

WESTERN SOUTHLAND.

Woodlands.—Shearing field day to be held. Members to act as stewards at the Invercargill Show. Good support for Y.F.C. stock judging at show. Mr. G. Stevenson (advisory member) brought up the matter of A. and P. Society membership, and Mr. A. Walker's generous offer to pay the second year's membership fees of fifty new members of the Invercargill A. and P. Society; several Club members decided to take advantage of this.

SOUTH OTAGO.

Lawrence.—Business meeting.

MID-CANTERBURY.

Methven.—Club debating team congratulated on its success in the debate with Darfield Y.F.C.; motion of thanks to Messrs. A. McKay and R. J. Low for providing fuel and transport to take the team to Darfield. Address by Mr. J. Fleming on "Land Valuation"; the speaker dealt very fully with the subject and touched on many matters of interest.

CHRISTCHURCH.

Ellesmere.—Date of annual meeting arranged. Dr. J. D. Blair gave an interesting talk entitled "My Recent Tour Abroad," illustrated by lantern slides.

NELSON.

Moutere.—One new member elected. General discussion on the collection of ergot. Talk by P. Evers, a club member, on "The Manufacture of Batteries."

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NAME .....

ADDRESS .....

MANAWATU.

Waituna.—Teams selected to take part in the Feilding Y.F.C. Show. Stewards appointed to assist. Impromptu speeches were given by members; these are very popular, and provide excellent training for those taking part.

WANGANUI.

Bulls.—The Dominion Organising Secretary, Mr. S. Freeman, attended the meeting with the District Y.F.C. Secretary, Mr. A. R. Dingwall. The appeal for the collection of ergot was brought up, Messrs. Freeman and Dingwall both taking part in discussion; it was decided to display samples of ergot and grasses in shop windows in the town and also to make sure that the four schools in the district are supplied with samples and full information. C. Mullins and S. Avery (club secretary) appointed delegates to the Bulls-Ohakea Sports Club meeting. Members to attend a farewell function to Trooper C. Grace, to be held at Sanson, when the club's presentation will be made. The following awards to club members in the Manawatu stock judging competitions were announced: S. Last-Harris, second in Romney section, and C. B. Anderson, second in Southdown section. Mr. Freeman addressed the meeting on Y.F.C. affairs, and stressed the responsibility of members left in New Zealand to maintain clubs for the members overseas. He then exhibited sound films of agricultural and general interest.

NORTHERN HAWKE'S BAY.

Meeanee.—Discussion regarding the collection of ergot and also on "Journal" subscriptions. Letter of thanks from District Secretary for the club's donation to district committee funds. Arrangements for lecture at next meeting. The district chairman, F. Magill, was present and spoke on club and district matters.

POVERTY BAY.

Gisborne.—Election of new member. Sum of £5, being part proceeds of dance, to be donated to Patriotic Funds. Impromptu speeches to be given by members at the next meeting. The collection of ergot was discussed, and the District Secretary, Mr. E. M. Ojala, Department of Agriculture, spoke on the subject. Mr. Ojala also gave an address on "Farming in the Waikato."

Te Karaka.—Letter of condolence to be sent to Mrs. A. G. Hultquist and family on their recent bereavement. The meeting took the form of a social evening. At previously unreported meetings addresses were given by Mr. Whitham ("Herd Improvement and Sire Survey") and Mr. H. Naultor ("Heredity").

WESTERN BAY OF PLENTY.

Kati Kati.—Discussion on proposed Y.F.C. memorial to the Mercantile Marine; decided to recommend that the scheme be given every consideration. Address by Mr. A. V. Allo, Department of Agriculture, on "Haymaking." At the previous meeting the Dominion Organising Secretary, Mr. S. Freeman, addressed the members and also exhibited sound films of agricultural and general interest.

Paengaroa.—Following a letter from the Te Puke A. and P. Association, it was decided to elect C. Ridell and G. Spratt to the committee of the association for the coming year, and S. McDowell, E. Blackmore, B. Vant, and G. Conway to act as stewards at the forthcoming show. Arrangements for a club dance. Talk by E. Blackmore on "The Y.F.C. Movement in the Bay of Plenty"; the speaker dealt particularly with the inception of the movement in the Paengaroa district, and gave details of recent club tours and local activities.

Te Puna.—Business meeting. Discussion regarding the proposal by the Paengaroa Club that a Y.F.C. Memorial to the Mercantile Marine be instituted.

AUCKLAND.

Harrisville.—Report on recent field day. Messrs. J. M. Smith, Fields Superintendent, and E. B. Glanville, District Y.F.C. Secretary, were present. Mr. Smith gave an illustrated lecture on "The Chatham Islands."

Health Notes for the Farm

Infantile Paralysis—A Treacherous Enemy

Contributed by the
DEPARTMENT OF HEALTH

QUITE recently there came under notice a distressing instance of what can happen through the doctor not being called early enough. The only child in a middle-class family—a boy of seven years—came home from school feeling rather seedy. He complained of being tired, and the slightest thing appeared to irritate him. He was far from the normal happy and energetic little chap that usually came home from school full of good spirits and fun.

A wise mother tucked him up in bed. Would he like something to eat? No, he didn't want anything to eat. And he felt hot. Mother found he was feverish. She didn't worry unduly. He had had these little upsets before, and a day or two in bed with a light diet and plenty of fruit juices had put him right again.

That is where she made a sad mistake, a mistake that has made the boy a cripple. He wasn't having just another bilious turn. He was showing the first symptoms of poliomyelitis, or infantile paralysis. If she had suspected anything more dangerous than a temporary childish upset, she might have called the doctor, and if she had called the doctor in this instance much of the worry and misery that resulted would probably have been saved.

The treatment of this terrible disease along well-recognised lines is now an established practice in New Zealand, as in other countries, and the fact that treatment is much more effective in the pre-paralytic stage is a strong reason for early and accurate diagnosis.

Terribly Deceptive

This resemblance to the symptoms of more common and less dreadful complaints is one of the insidious features of the onset of infantile paralysis. It can be terribly deceptive, and parents are warned against treating these signs too lightly or against relying on their own experience and judgment.

If your child is drowsy and irritable and feverish and doesn't want to be moved, become suspicious at once. Call your doctor. Sometimes the early symptoms may be very mild, and yet within 24 to 72 hours the child may be unable to move an arm or a leg. The most significant symptom of infantile paralysis is a stiffness which makes it impossible to bend the spine and neck forward.

Early diagnosis is admittedly difficult, and doctors themselves will concede that usually only in the presence of epidemic conditions can an immediate diagnosis be made at the onset of the first symptoms.

There is much about infantile paralysis that is still not understood. It is known to be an infectious disease, and it is believed that the virus causing it is spread directly and indirectly from one person to another in much the same way as other contagious diseases of childhood are spread. As a matter of fact, mild cases of infantile paralysis could be quite easily indistinguishable from influenza, and, in all probability, there are cases where they have been treated as such.

May Strike Anywhere

The paralysis may strike anywhere, but most commonly it attacks the legs, particularly the lower leg muscles. Arm paralysis follows next in frequency. The paralysis, though, might strike any muscle, and it can, and frequently does, affect the eyes, the facial muscles, and the throat muscles. Paralysis of the diaphragm is the most serious phase of infantile paralysis, and can cause death. Indeed, in some fatal cases death is so sudden that the cause is not at first apparent. Indefinite symptoms may have preceded for one or more days without the paralysis being evident to either parents or physician, especially with infants and very young children. Yawning has been frequently observed as a very serious symptom.

Always remember, the doctor may be able to lessen the crippling after-effects if he is called before the legs or arms begin to show paralysis.

It is important that all parents should be on their guard, particularly during the summer and autumn months. Suspect the worst until the diagnosis is proven.

APIARY NOTES—(Continued from page 133.)

accordingly. The period of supply is very short, and therefore no allowance can be made for the bees to recover a depleted strength to supply more package bees. It is a question of forcing the bees to obtain a maximum strength early in the spring, of merely removing a small portion of the bees to act as a measure of swarm control, or of depleting the colony strength to such an extent that the production of surplus honey would be impossible. There is a tendency in North Auckland at the present time to retard the colony strength in the spring, with the view of avoiding the production of dark honey and of having the bees at their maximum strength during the flow of light honey. The value of the bees must be assessed accordingly, and, in the circumstances, this has been calculated to be 2/3 per lb.

For the purpose of package bees only, young Italian laying queens of a good commercial strain have been valued at 6/- each. The cost of labour has been assessed at 7d. per package, and this appears to be reasonable in view of the work involved. Other costs cover candy at 4d., and transport to out-apiaries and the place of departure at 1d. The estimated total cost of supply on these figures is 17/6.

It will be noted that many factors covering the supply of bees have been elucidated by this experiment, but the possibilities of package bees being a success depend also on their honey production, the value of which has been under observation in the south during the past season.

Details of the work on the experiment in the South Island will be given next month.

—L. RIESTERER, Apiary Instructor, Auckland.

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THE Good Neighbour

BY MARY

From Me To You

I THINK I told you some time ago of the old Hindu saying: "Yesterday is but a dream of what we have done in the past . . . and tomorrow is only a vision of what we might do and can do. . . . Look well, therefore, unto this day." But a good saying, like a good book, can stand re-reading, and so I have given it to you again, partly for your enjoyment, and partly because it illustrates to some degree what I want to talk to you about today.

"Yesterday is but a dream of what we have done in the past." And dreams, as time goes on, are inclined to become mellowed and softened with memory, so that those things we did last summer seem now to be very much more exciting than those things we are doing this summer. Are you one of those people who are always judging things by comparison? You hear them everywhere—just listen next time you are in a train, or a tram. "What a pretty frock you have on," says one friend to the other, and the reply is, "Not as pretty as the blue one I had last year," or "What beautiful sweet peas they are!" "Not as big as they were last year." Or it may be only a day's difference: "What a glorious day it is!" "But not as fine as yesterday." You can't get away from them, these people who always judge things by comparison, instead of on their merits. Surely last year's frock was really no prettier than this year's blue one? It is only because of that annoying little habit which has developed, possibly quite unknown to you, that you think last year's frock prettier than this year's.

It IS an annoying habit, nothing more or less. Study yourself, next time you are talking of anything, and see if you too are using the unconscious standard of judging on comparison, rather than on merits. You will probably be surprised at yourself if you find that you are an offender, but just a little perseverance, and you will break yourself of it.

For bringing this critical attitude to bear on everything you say or do surely must affect your outlook on life, makes you feel that nothing this year is as good as it was last year. Perhaps many things certainly are not as bright this year as they have been in earlier years, but you do not gain anything by being comparatively critical—on the contrary, you are inclined to lose a lot of the enjoyment of today in sighing for a golden past.

Today is what you make it—and today is every bit as good as yesterday. So next time you are tempted to tell your friend that this year's sweet peas or roses are not as good as they were last year, do count ten first, and then tell her they are just as big, and just as beautiful as they ever were in years gone by.

Mary

Mary's "At Home"

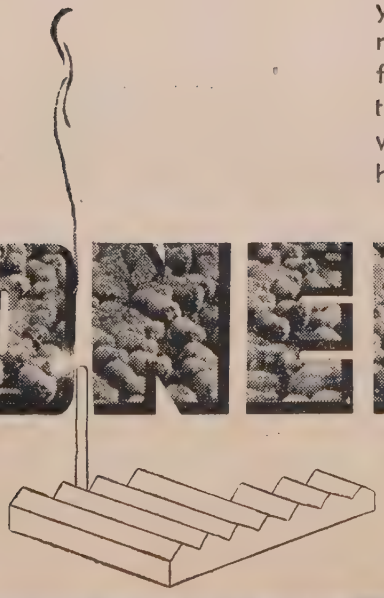
JUST now I am reading "The Gardens of Good Hope," by Marion Cran. She tells of two women who have a flower farm on a mountainside in Africa. There is a delightful photo of their small cottage, and a glorious view, and they have such good neighbours that it set me to thinking of our "Good Neighbours." I expect "Plain Jane" is not so plain, and I had a real neighbourly feeling with Judith—so often the hens do a spot of gardening in some favourite spot. And the blackbirds and thrushes, too!

Some time ago, when the snow was on the ground, I went out to gather the last of the apples. We had two trees of very late, small russet apples, and what a sight met my eyes! All the birds for miles around seemed to be gathered on those trees, simply tearing the apples down, and gobbling them up. They all looked so busy and were so very hungry that for shame's sake I stole away, and left them to it. But a day or so later, when the Man of the House was inquiring for the apples, I had to confess to my weakness in letting the birds have them. I did like "Silver Fern's" letter, and I hope the lovely flowers are out for you now. With books, and flowers, and a good log fire, on a winter's night, one has all of life that matters.—**Helen, Southland.**

OFTEN at night I have ridden alone with only the stars and dark, warm hills for company, yet I have never felt alone. The stars seem to twinkle

Down to the sea in ships....

Salute to the men of the Merchant Marine—unsung heroes of the sea. When Atlantic winds tear spindrift from grey rollers, these men welcome warmth—and that's where ONEHUNGA Blankets are to-day — on active service. Should you have any difficulty in buying blankets, remember that the ONEHUNGA Mills are weaving for defence. But we join with you in the hope that the clouds will soon roll by and that "ONEHUNGA" will once again be on "active service" only in the homes of New Zealanders.



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in friendliness and even the hills surrounding have a particular charm. Humanity is like the stars. Millions of stars in the sky each form a part in the sky, each has its own place. Some are in groups, others far apart, while hosts form the Milky Way, but how dim is their light. They look highest in the sky, but are furthest away. So it is with our lives. Some stand apart, others in groups, while many just follow the crowd in a surging throng. There are those who strive for material things, and gain wealth and splendour, and though they may look high in the eyes of man, they are furthest from God.—**Jewel, Tokomaru Bay.**

A RECENT experience made me think that even the worst of us are of some use. This and adjacent districts had a roaming undesirable. He was a good worker if he wished, but he was very erratic. When goods disappeared from breadboxes and cream cans, the remark went round: "'Blank' is back. I wish he would move on permanently." In the opossum season he made good money, only to spend it on drink. But now he has moved on permanently—a motorist got him. This season my apple trees showed promise of being heavily laden, till one morning I noticed three of them stripped of leaves and blossoms. "Blank" has gone, but if we want any fruit there is now another pest with which we have to contend.—**Noremac, North Auckland.**

I WISH more parents would give their children a heap of sand to play in. My little three-year-old loves to get his barrow filled, wheel it off and empty it, only to repeat the performance again and again. One day he had a little boy to play with him, and didn't the two shift a mountain! The visitor lamented that his daddy hasn't time to get him any sand.—**Mrs. Vee, Hamilton.**

"I'VE been considering your views on the recreation of art being our future culture, and to keep it up at present. Although I have very little spare time, and haven't done any art work for nearly two years, I have managed to almost complete two oil canvasses: one a large bowl of roses, the other a small one representing an idea I had. I've been enjoying this treat after such a long lapse. I have dabbled a little in each for the love of it: water colours, oils, and black and white. I'm hoping to take up further study at the School of Art after the war. I would love to be able to write well, but I haven't the ability for that, so have to be satisfied with a few sketches of home events that I add to my diary exercise-book every now and then.—**Jeanne, Rakaia.**

ANOTHER resolution is to get my letters up to the minute, but what a pile there is! I was specially interested in "Roundabout's" expressions on life, and her sister in particular. I think the sister she referred to was very young when expressing foolish intentions, and surely the young are privileged. At least, be as easy as we can on them.—**Mrs. V., Waikato.**

THIS Christmas was the first experience I have had of Christmas carolling. Our church choir spent two evenings at it, and for me they were particularly happy occasions. We took no instrument except a tuning fork for the "note," and the voices in harmony on the evening air were very pleasant. There were very few refusals—indeed, most of the folk thanked us for the memories we called up. And I am quite sure that we brought a breath of the unseen and lasting things of life to folk who were glad to forget the anxiety and fears of today just for a while. The actual cash result was very good, but there was a gain far greater than that, really.—**London Lass, Wellington.**

Our success depends upon the strength of our purpose; and if we would make much progress we must use much diligence.

Maybe, Mary, I have told you that I never get ill—as a rule I don't even catch colds, and laugh at my brothers who always call me abominably healthy! However, I've let myself down badly of late, for not long ago I landed myself in hospital. . . . As I had to be ill, I made up my mind to get all the fun possible out of it, and there has been plenty. The best part of all is that I've had three weeks at home, and I've loved it. You know how I love my home, especially in the summer, and I had wondered how I could live through a summer in the city. Next Monday I am due back at work again, and I really will be glad to go. My work still thrills me; it is wonderful to be really helping with the war effort, and the fun and satisfaction we get out of the work more than compensates for any of its disadvantages.

My soldier brother is in Egypt, and writes home every week. He never complains, but one cannot help but know that he is very home-sick, and longs for home, his garden, and those he loves. We miss him, too, especially on Christmas Day, but just hope that he will be home with us ere another such day comes round.—**John-in-the-Middle, Christchurch.**

WHENEVER I feel down in the mouth these days (and are there any of us who don't on occasions?), I think of this slogan which I once saw in a city lift: "You use seven muscles of the face when you smile, thirteen when you frown, so keep smiling." And it works wonders, too! —**Pigtails, Wellington.**

Button Loops

PEARL buttons and little silk loops are the most usual fastening for small children's frocks, and if you haven't yet discovered an easy method of working these loops, try this way. Place a round pencil flat on the material exactly where you want the loop. Take a little stitch on the left-hand side of pencil, then bring the thread over the pencil, and take a stitch on the right. Work backwards and forwards thus until the foundation of the loop is ready. Then buttonhole in the usual way, slipping the needle between the pencil and the loop foundation as you work.

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. . . How Does Your Garden Grow?

WHAT a joy it is to Mr. Hyde that so many of you are enjoying and making good use of his Garden Notes each month. Every mail seems to bring me fresh letters of appreciation from one or another of you, and if you keep on following his good advice, your efforts will be well repaid. This month Mr. Hyde advises you to look ahead to the spring by planting your bulbs and other spring flowers, and by giving careful attention to your lawns.—MARY.

NEW lawns may be sown down now, or, if the area is moderate, turfing is a good quick method. In doing this, the first requirement is a clean, smooth surface of even density at the required level. This is obtained only with considerable labour and care, but sowing down should not be done until it is achieved. If the land after cultivation is allowed to lie and settle down for a few weeks, it consolidates with the least amount of labour, and if light cultivation is done at intervals seedling weeds are destroyed. During the process perennial weeds will make sufficient growth to indicate their identity and position so that removal is facilitated. It is essential that the surface should be at the right elevation and grade, for in the final result appearance and maintenance are much superior where this is properly done.

A high verge to the lawn is rarely required, although in the case of a heavy, strong soil such a verge is sometimes cut with a view to avoiding strong growth which may efface the outline. Light land will absorb storm water quickly, but in other cases the grade should be sufficient to run the water off promptly into suitable water tables, sumps, and culverts. Neglect of this precaution is common, and the result is badly-drained areas in walks and lawns and local subsidences, which are unpleasant in every way.

When a clean, smooth surface at the right level is at last obtained, it is usually best to work in a light dressing of fertiliser before sowing down the lawn during a period when no wind is blowing. Equal quantities of superphosphate and sulphate of ammonia is very commonly a suitable mixture, applied at the rate of 1 oz. to the square yard and worked in by means of shallow cultivation. A grass seed mixture for fine lawns which has given great satisfaction in many localities is one part of Government certified browntop to two parts of New Zealand Chewing's fescue sown at the rate of about 1 oz. to the square yard. Other lawn mixtures are available from local seedsmen who have made a study of the special requirements of the particular district. When the seed is sown it should be raked in evenly with a clean, sharp rake without alteration to the surface levels obtained. It should then be left until germination has taken place. When 2 or 3 inches of growth have been made it is ready for cutting.

Where small areas are being dealt with, good turf laid on the smooth graded surface of the soil will soon take root at this season, or at most periods during the winter and early spring, and the desired result, or at least the effect, is obtained at once. The main requirement in this method is reasonably good turf closely mown, which, however, may be expected to show great improvement under a system of regular cutting and attention. The turfs are about a foot square and of even thickness, and are laid with broken joints. Thickness is adjusted by laying them, with the surface down, in a mould and removing the surplus soil with a two-handed knife.

What To Do During March.

Sow or turf down new lawns.

Plant out bulbs and other herbaceous plants which bloom in the spring.

Sow sweet peas and other hardy annuals for early flowering.

Continue to take cuttings of herbaceous plants.

Pots of winter-flowering geraniums should be washed and taken into the house.

In the established garden dahlias will be at their best, chrysanthemums approaching that state, and some bedding plants past it. Hydrangeas, fuchsias, and *Anemone japonica* will be a making a good display, together with trees and shrubs noted for coloured autumn foliage or berries. As bedding plants go off, the beds and borders concerned may be trenched and generously manured in preparation for planting with bulbs and other herbaceous plants, such as wallflowers, pansies, primroses, mysotis, anemones, ranunculus, crocus, and other spring-flowering favourites, which may be planted now as soon as the preparation of the land is completed. In warm situations, lachenalias, freezias, amaryllis, and muscari make a notable display, and in other districts generous areas in narcissus, lencojums (snowflakes), and scillas (bluebells) are easily naturalised in the outskirts of the garden, giving an excellent return for little labour.

Sowings of cornflowers, larkspurs, shirley poppies, and sweet peas may be made, and cuttings taken of pentstemons, violas, marguerites, pansies, heliotrope, ageratum, etc., in pots or boxes in a cold frame; this, however, should be attempted only if considerable time can be given to shading, ventilation, and watering. Lift and plant lilies, and remove the runners from violets. Pots of winter-flowering zonal geraniums should be washed and taken into the house and given a light, airy position—a sun porch is ideal.

—WM. C. HYDE, Horticulturist, Wellington.

Picking berries in her own backyard the Columbia star, Penny Singleton, wears a sharkskin playsuit saddle stitched in navy blue.

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Picnics Are Such Fun

PETROL and travelling restrictions have been so drastic this year that few of us have been able to wander far from our usual haunts. It's a pity in many ways, for these days especially everyone needs their holidays—people in the cities are working harder than they have worked before, and people on farms in many cases are tackling the work of two or even three people.

But I would say to you all, do make a special effort to have a day off now and again, because a day away from your home can work wonders, and even after one whole day away you can come back feeling "full of beans" as the saying goes. For the kiddies, too, a picnic is always fun, although to some of us older folk the word picnic conjures up visions of seemingly endless days spent on windy, sand-swept beaches, or beside cold rivers. It all depends upon the humour in which you start off for your picnic, and also, of course, the folk who go with you.

Don't make your picnic too organised, and don't plan them too far ahead, for the weather is so inclement, and, especially with kiddies, nothing takes the edge off a picnic as much as having to postpone it. Better by far to suggest a picnic when the day has dawned brightly, and shows promise of keeping fine.

Don't make heavy going of your foodstuffs—I would suggest that you put a loaf of bread into your basket, along with tomatoes, a pot of jam, and a slice of butter, rather than spend half the day at home cutting sandwiches. Sandwiches are never so tasty when they have been kept for a while as when they are freshly made. If you do think of going for an outing the night before, what about stewing some rhubarb and setting it in a jar with a little sago? This carries well, and is always acceptable to hungry mouths, especially when the day is hot. Jellies set in small cartons, too, are welcome.

If you are thinking of boiling the billy, or perhaps cooking some saveloys or sausages, make sure you take some small sticks to kindle your fire, and make very sure that your fire is completely out before you come away. You can never be too careful about putting fires completely out, and they may cause untold damage if any should happen to set alight to the surrounding countryside. Fruit is always a good standby, especially for the youngsters, and perhaps a bottle of fruity cordial, if you have room for it, would be welcomed by thirsty folk before the day is out.

If you are going to the beach, or to a river where there will be facilities for swimming, then the entertainment of the picnickers should provide little or no difficulty. However, if there are no bathing facilities near your picnic spot, be sure to take along a bat and ball, for plenty of fun can be had with games such as rounders, and cricket.

Are you one of those families that invariably picnic off newspaper, and then leave the papers to blow round in untidy fashion? Why not make a picnic tablecloth? So inexpensive, but so useful. Just make a tablecloth of some gay material, with a pocket in each corner, so that you can slip a stone into each one when you lay it on the ground, and there will be no need to worry about it blowing away if the day is windy. Snap clothespegs can be invaluable for clipping together such things as towels, hankies, or even articles of clothing, which invariably have a habit of becoming mislaid when it is time to go home.

Make sure the youngsters have shady hats, comfy shoes, and a bag each, however small, in which to carry their share of the picnic load, take along a book or magazine for yourself, or perhaps some knitting if you prefer that to reading, slip in a bottle of citronella as guard against insect bites, and some soothing lotion or cocoanut oil to prevent sunburn, and set off for the day with a song on your lips and a smile in your eyes—the day will be just all right, and you will come back to your daily tasks the next morning feeling as though you have had a week away from home instead of less than a day.

Who is hungry? Lunch time at this picnic for two—Mary Howard and Ann Morriss—who have taken a day off from their cares at the studios of Metro-Goldwyn-Mayer to enjoy themselves at the beach.

Before Sleep

O child of struggle, here's the night!
Then rest, then rest.
Let peace come settle on your brow.
Put out the light—
Nor back to the old battle hark.
Draw down the shades,
Put out the light. And in your soul
Put out the dark.

—Agnes Lee.

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Our Competition

"The Ideal Husband"

AFTER reading your entries for this competition I am quite convinced that none of you want to possess a perfect husband, but that a lot of you evidently possess an ideal husband. And so your ideals have been coupled with plenty of commonsense and practical knowledge.

First prize this month goes to "Puckling," Wairarapa, and second to "Mini Haha," Otago, while highly commended we have "Roundabout," King Country.

First Prize

"THE Ideal Husband"—dreams of youth! Through experience I have formed my ideal. He is a man who loves his wife with an everlasting love, even after discovering her weaknesses. His love is not silent. Nothing keeps a woman happier than to hear that she is loved. My ideal is not above telling his wife she is beautiful on occasions—this gives a woman pride and self-respect. He is a man with love of children inborn. No man can hold a woman unless he is a good father to her children.

My ideal possesses an abundance of patience, and is determined to the point of pig-headedness. No woman is really happy if she can master her man in a clash of wills.

My man is interesting. He keeps to himself a little of himself—enough to invoke curiosity. A woman likes to be kept guessing.

In sickness my ideal is tender, thoughful, and helpful—but stern when necessary. And he has a courage that nothing will conquer. He can surmount all life's difficulties with a cheery heart, but his troubles are always taken to his wife. A woman needs the opportunity to comfort.

My ideal is ambitious, not greedy for gold or position, but seeks to gain a place that will make for family happiness, and respect from all. And lastly, my ideal husband must have an unfailing sense of humour. Nothing will crush the wings of love more quickly than the lack of that attribute.—**Puckling, Wairarapa.**

Second Prize

SO many promising lovers, yet how few develop into ideal husbands! The ideal husband would not be perceptibly different from the lover, he would still, when occasion warranted it, compliment his wife upon her appearance. He would also, as of yore, suggest little outings—even a moonlight walk, for all women, irrespective of age or status, are incurably romantic.

Then there is no more admirable quality in any husband than a sense of humour, to laugh with her, not at her, to share all the fun, but never under any circumstances hold her earnest attempts at housekeeping up to ridicule. One thing an ideal husband would never do, and that is make fun of his wife in public.

Without being effeminate or fussy, he should, in the case of illness, be able to do the essential jobs about a house, prepare a plain meal, and make things presentably tidy.

Between husband and wife, there must be interests in common. A united front upon important questions, such as religion and politics, is very necessary, but in minor matters a husband should not force his opinions upon his wife—rather should he encourage her to form her own opinions, and express them lucidly. There is no better insurance against boredom than a good friendly argument.

When the "ideal," through mutual consent, becomes plain "dad," he must be a sensible one, treating the children as individuals, not as playthings to be teased and laughed at, and occasionally spanked. Neither should he take credit unto himself for all their good points, leaving all the bad ones to his wife.—**Mini Haha, Otago.**

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Is this the ideal husband? Melvyn Douglas, Columbia star, arrives home carrying the groceries after doing the the shopping.

Highly Commended

HOW true are your words, Mary, that no husband is ever "perfect," but he may be ideal, nevertheless. My conception of ideal is that which has reached such a standard of excellence (albeit perfection) that it gives one the capacity to idealise it. Were I the ideal wife (and she is the correlative of the ideal husband) I would have no qualms in depicting the qualities that go to form an ideal husband, but having no delusions about my own short-comings, I shall just set forth what appeals to me most in this ideal husband quest. This embraces:

1. A solid, reliable anchor, one on which I could depend for both the ups and downs of life.

2. One able to play as well as to work, for how true it is that all work and no play makes Jack a dull boy.

3. One considerate and broadminded—able to see the views of another as well as his own.

4. A natural person with no subterfuge—aping what he is not.

5. One who is undoubtedly master in his own house, yet who gives his wife her unquestioned right of being mistress in his house.—**Roundabout, King Country.**

I AGREE with Mary that the perfect husband does not exist, anyway he would be a terrible bore to live with! My ideal husband would be as follows:—

Have You Any Strange Impulses?

DEEP down in our hearts I am sure we all have our strange impulses—for myself, I always want to stop the marriage service at that critical moment when the minister says, "If any man can shew any just cause why they may not lawfully be joined together, let him now speak, or hereafter hold his peace." But I haven't said anything yet!

"WHAT IS YOUR STRANGE IMPULSE?"

Tell me what you think is your strangest impulse. 10/- first prize, and 5/- second.

Send your entries to—

"MARY,"
C/o "Journal of Agriculture,"
P.O. Box 3004,
Wellington.

¶ Closing date: 20th March, 1942.

He'd never forget birthdays and other anniversaries so dear to the heart of a woman.

He'd never come indoors, not even for a minute, with muddy boots.

He'd always be cheerful and ready to lend a hand if necessary.

If he didn't like or agree with a thing, tell his wife privately, and not in public.—**Plain Jane, Taupiri.**

MY IDEAL HUSBAND.

He needn't be handsome, or dashing, or tall,
Nor wealthy, nor yet over-wise,
But the man who will charm the heart from my breast
Will be one who has merry brown eyes.
I don't want a "doormat"—no mind of his own,
Nor one who would bluster or sneer:
But a mind quick and eager, a wit keen and kind,
And a voice, deep and friendly and dear.
He needn't be perfect, he may have some faults,
But I'm willing to love him for those.
I may want to tease him, I hope he'll tease me,
For that is how comradeship grows.
A lover of laughter, of children, of books,
He'll be true under grey or blue skies,
But this man of my heart, this king of my life,
Simply must have two merry brown eyes!

—London Lass, Wellington.

THE ideal husband is "easy to live with," and that is a perfect summing up. It means that he is not too perfect, or he would be very hard to live up to; nor yet too imperfect, or he would be hard to live with. A woman expends quite a lot of care over the selection of a hat, which is only used for a short time, so what care should she take over the choice of a life-time partner!

She should choose a companion with qualities which will stand the test of time, the most important of these being honesty, courtesy, practicability, broad-mindedness, temperance, and loyalty. He must also be healthy, and possess a sense of humour, for a man who can never see a joke in anything is certainly a dour companion.

In short, the everyday man, provided he has the above qualities in moderation, makes the ideal husband, always provided that he is willing to share all the ups and downs of life's journey, and doesn't expect his wife to be more perfect than he is himself.—**Mary Ann, Bell Block.**

If you wish to use mutton dripping for pastry, weigh it (½ lb. to 1 lb. of flour) and grate it on a vegetable grater. Make a hole in flour in bowl, put in the centre with a pinch of salt, and mix to a dough with salt, and usual quantity of baking powder. If desired, add 1 dessertspoonful of lemon juice.

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While the Log Burns . . .

The Story of J.M.B.

By Denis Mackail.

With rapturous face he produces his Pipes and the Birds and the Fairies gather closer.

WHAT are we going to read today? I have just finished a delightful book which I am sure all lovers of those immortal favourites, Peter Pan and Wendy, will enjoy. It is quite a recent book, and you may not have been lucky enough to have come across it yet. But you will enjoy it, I know, especially if you are a lover of the works of that great writer, J. M. Barrie.

Denis Mackail has given us here a true story of the life of J. M. Barrie, telling of his successes and his failures, letting us share with him all the incidents in the life of this writer of recent times. The book is a biography, but you will find it as absorbing as any book of fiction. It begins in the year 1860, when J. M. Barrie was born in Scotland, and from then on traces the story of his life until he died in 1937. Through its pages we can trace the genius of the man whose works will live down the years, long after he has been forgotten for himself. Barrie was a genius—of that there is no doubt. Plays, stories, novels all flowed with ease from his facile pen. Who, after having read it, will forget "The Little Minister," one of the most fascinating books ever written? Who will forget the delightful play, "Quality Street?"

It is useless to try and quote passages of this book. The story of this writer's life covers seven hundred pages—if you are a writer you will enjoy every word of his successes, if you are not a writer, you will enjoy every word of how he lived his long life.

We all of us remember the delightful story of "Peter Pan and Wendy," and because of this great book which J. M. Barrie gave to the world, his name will become immortal. Do you remember the piece where he told the beginning of fairies? "When the first baby laughed for the first time, his laugh broke into a million pieces, and they all went skipping about. That was the beginning of fairies. They look tremendously busy, you know, as if they had not a moment to spare, but if you were to ask them what they are doing, they could not tell you in the least."

The immortal J. M. Barrie—like his famous character, Peter Pan, he was a man who never grew up. We are only as young as we feel—perhaps we could all remain Peter Pan's all our lives if we were like J. M. Barrie.

"The Window Box"

IT was a bright spring morning, the sort of morning that makes you want to leave the dishes, and dash out to the rain-sodden garden. I had come to town, and there I wandered, gazing at goods beyond my purse, till I came to the shop at the corner. I had been there before—who hadn't? Always there was a hand outstretched to catch the passerby. Today the hand was a bowl of frail violets, and there were "fingers" of pale golden, with lemon centres. "The Window Box," the shop was named, and certainly the crowd hovered round like bees on the first plum blossoms.

They were all there—the different types. Madam was buying the best shrub the shop had—Mrs. Back Street was envious, but then happy as she hurried away with her shilling lily. The matron with the shopping bag bought several packets of seeds (you couldn't see the snow on the hills from the city). Two nuns entered—a beautiful sheaf of white lilies was awaiting them. A school girl stopped at the violet bowl. She had threepence, and wanted a spray for her mother. And the farmer had an order made up for him—shelter trees, seeds, and—but this was not in the order, surely? Hard, busy man that he was, the flowering shrub at the door had taken his eye. A present for someone, no doubt. A car drew up, and in came a young girl. A murmur went round as she passed through again—a bridal bouquet!

And so the shop assistant came forward to me. "Certainly, madam," and he handed me two bundles, one of lettuce and one of cabbage. Ah, well! The matron gave me a sympathetic look—but it takes all sorts to make a world, and besides, I have my own garden full of choice flowers at home. **—M., Feilding.**

Mary's Mixing Bowl

Tasty Savouries

THE prize of 2s. 6d. for the best savoury recipe is awarded to "Whim," Tapawera, for the following entry:—

SAVOURY SURPRISE ROLLS.

Puff or short pastry, hard-boiled eggs, minced ham, chopped parsley, mayonnaise.

Cut eggs in half lengthwise. Roll pastry out thinly in oblong lengths enough to roll egg in. Dip eggs in mayonnaise. Roll thickly in minced ham and parsley. Roll pastry round them. Seal ends. Glaze with milk. Bake till nicely brown, about 30 minutes.—**"Whim," Tapawera.**

TOMATO JUICE SAVOURIES.

To 1 pint of tomato extract, or juice, add about a dessertspoonful of chopped celery and onion. Simmer for 10 minutes. Strain and allow to cool. Add 1 oz. of gelatine dissolved in a little hot water and pour into egg-cups. When ready for use, scoop out about a thimbleful from the centre, fill with cream cheese and mayonnaise; serve on a thin slice of tomato in a lettuce leaf. To turn mould out, loosen the edge with a knife, stand the egg-cup in hot water for about a second, then turn out. These are delicious.—**"Biddi-Jan," Christchurch.**

LITTLE BRAIN PIES.

Line some patty tins with good short pastry and bake a light brown. Wash and skin two sets of sheep's brains and cook in enough milk to cover, adding pepper and salt to taste. Simmer for a few minutes. Have ready a hard-boiled egg cut up very fine. Beat the brains well with a fork,

add the egg and liquid that the brains were cooked in, and thicken with one teaspoon of cornflour. Fill patty tins with the mixture, sprinkle with fine breadcrumbs, and bake a nice brown.—**"Jezebel," Waipu.**

KIDNEY FINGERS.

Mince an ox kidney and stew till tender. Cut thick fingers of fresh bread. Roll in thickened kidney mixture; then roll in beaten egg and fry in deep fat; drain and serve, arranged on individual lettuce leaf, with a dash of salt, and a dot of mustard if you are sure of the eaters being fond of this ingredient.—**"M.," Feilding.**

EGG CIGARS.

Beat two hard-boiled eggs up with 1 teaspoon butter, salt, pepper, and chopped parsley. Roll out some pastry very thinly and cut into strips. Spread with egg and bake till light brown. These should be about 2 to 3 inches long.—**"M.," Feilding.**

SAVOURY.

Cut rounds of bread with a biscuit cutter. On each round put a scrape of butter, a round of saveloy about ½ inch thick, a dab of scraped apple, and a dash of cinnamon. Put into a hot oven and when the bread is browned the savouries are done. Besides being a welcome addition to p.m. tea or supper, they are quite a nice entree, or even a children's tea.—**"Molly Malone," Clinton.**

CHEESE SAVOURIES.

2 oz. butter, 2 oz. flour. Rub well together and add 1 oz. grated cheese, a pinch of cayenne pepper, and a pinch of salt. Roll thin, cut into small rounds, and bake till crisp. When cold put following mixture on top.

Whip some cream, add finely grated cheese, cayenne, and salt to taste.

Sponges are Delicious

FEATHERY, airy sponges, thick with fruit and cream—what could be more delicious? Let us share your favourite sponge recipe—2/6 for the best one sent to the "Mixing Bowl" before March 20th, 1942.

Have this mixture nice and stiff, and put it through the biscuit forcer in circular shape, and add sprig of parsley on top.

These savouries look most attractive and are delicious to eat.—**Mrs. J. H. Patterson, Ashburton.**

CHEESE AND BACON FINGERS.

Have some hot buttered toast; sprinkle with grated cheese and finely chopped bacon. Put in oven just long enough to melt the cheese and bacon. Very nice for afternoon tea or supper, as they can be prepared any time and warmed when needed.—**"Roundabout Savouries," Waimiha.**

BLACKBERRY CAKE.

Half cupful butter, 1 cupful sugar, 4 teaspoonsful cold water, 1 teaspoonful soda, 2 eggs (separated), 2 cups flour, 1 cup cooked blackberries, 1 teaspoonful cinnamon, ½ teaspoonful cloves.

Cream butter and sugar together until very light, add beaten yolks, blackberries and water, alternately with soda, spices and flour mixed. Beat thoroughly, cut and fold in beaten whites, bake in a loaf tin in a moderate oven about 45 minutes. Cool, cover with favourite icing.

QUEEN CAKES.

½ lb. sugar, ½ lb. butter, ¾ lb. flour, 4 eggs, 1 teaspoon Edmonds baking powder, 4 oz. currants, flavouring to taste.

Beat butter and sugar to a cream, then beat in eggs. Mix currants with flour and baking powder and add to mixture; lastly flavouring. Divide into patty pans. Bake in hot oven (400 deg. F.) 10 to 12 minutes.

BLACKBERRY PIE.

Two tablespoons cornflour, 1¼ cups hot water, 1 cup sugar, ¼ teaspoonful salt, 1 cupful seedless raisins, 2 cups blackberries, 1 tablespoon butter.

Mix together cornflour and salt. Add hot water and cook, stirring constantly until mixture thickens. Add blackberries, raisins, and butter. Fit pastry into pie dish, and brush bottom with

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melted butter. Add filling. Over the top arrange strips of pastry about ½ inch wide, criss-crossing them. Fasten the ends of the strips to the end of the pie crust by moistening with water. Build up the outside rim with an extra strip of pastry, and bake in a hot oven for 20 minutes.

TOMATO DUMPLINGS.

Six tomatoes, 2 oz. cooked macaroni, 1 lb. short crust pastry, 2 oz. grated cheese.

Cut a thick slice from the stalk end of each tomato, and scoop out centre without breaking skin. Mix cooked macaroni, broken into very small pieces with the cheese, add pepper and salt, and fill tomatoes. Roll out pastry, cut into rounds large enough to cover each tomato, seal at top by wetting the edges and pressing together, and bake 40 minutes in hot oven.

DOMINION BISCUITS.

1½ breakfast cups flour, ½ cup ground rice, 2 tablespoons sugar, 4 oz. butter, 1 tablespoon milk, 2 eggs, ½ packet spice, little salt, good teaspoon baking powder.

Mix all dry ingredients, beat eggs and butter, add 2 yolks, and 1 white of egg, also milk. Mix into a stiff paste, divide in two parts, and roll out. Cut into rounds. Bake very lightly, about 10 minutes, and when cool fasten together with jam, and ice.

CREAM PUFFS.

½ pint water, ½ pint cream, 4 eggs, ¼ lb. butter.

Put butter and water into a saucepan, and when it boils, stir in the flour. Take off the fire, beat in the eggs, one at a time, then beat for about five minutes (until the mixture becomes shiny). Butter some baking sheets, and drop on spoonfuls of mixture. Bake in a good oven for ½-hour, open cases, and fill with cream. Dust tops with icing sugar.

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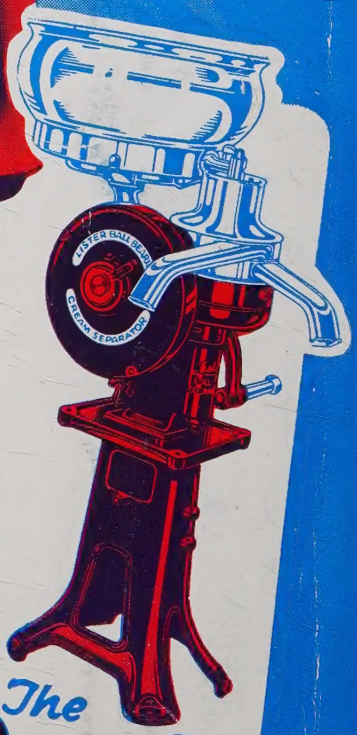

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